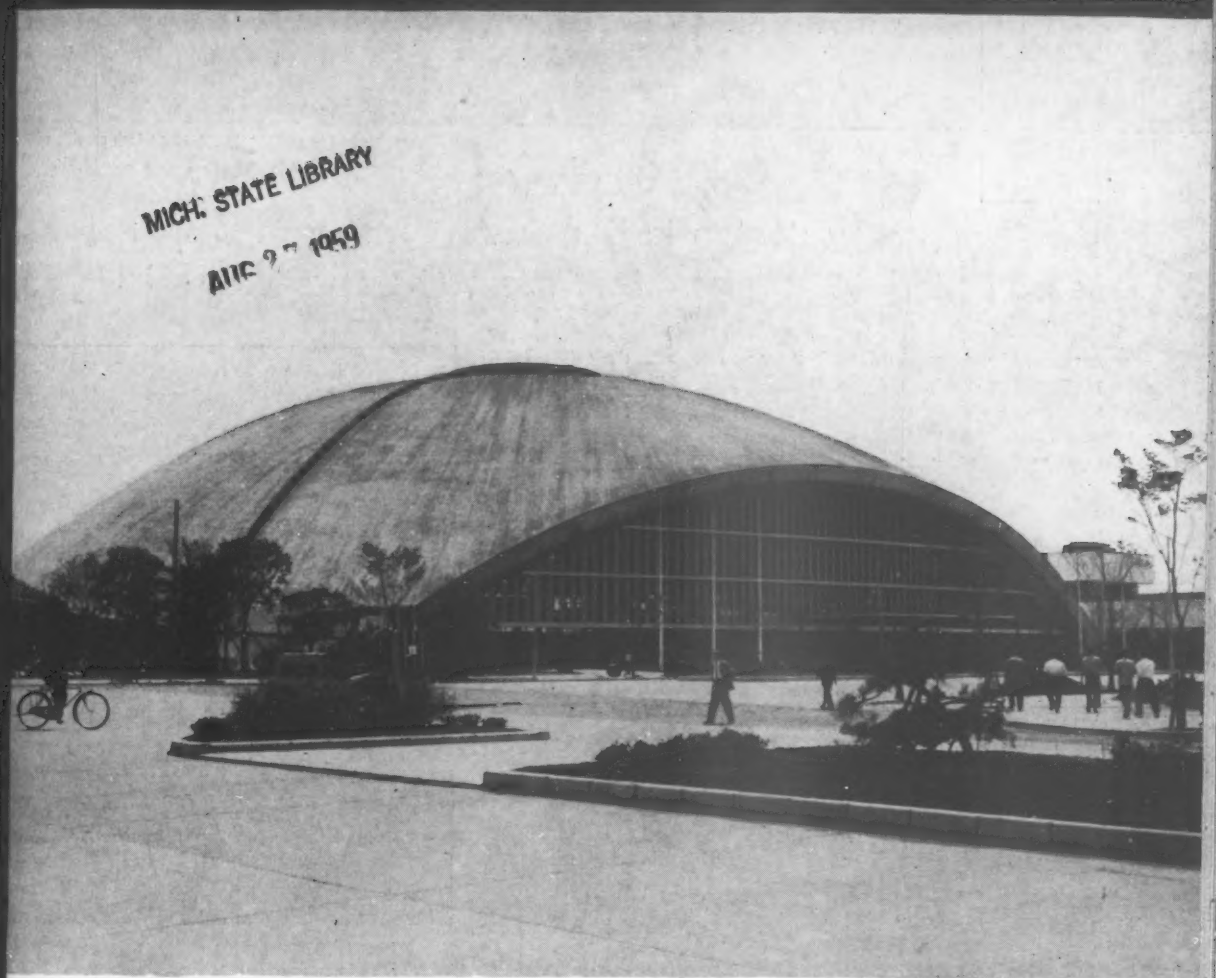
ENGINEERING NEWS-RECORD



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Tokyo dome: A complex job goes up in a hurry p.34

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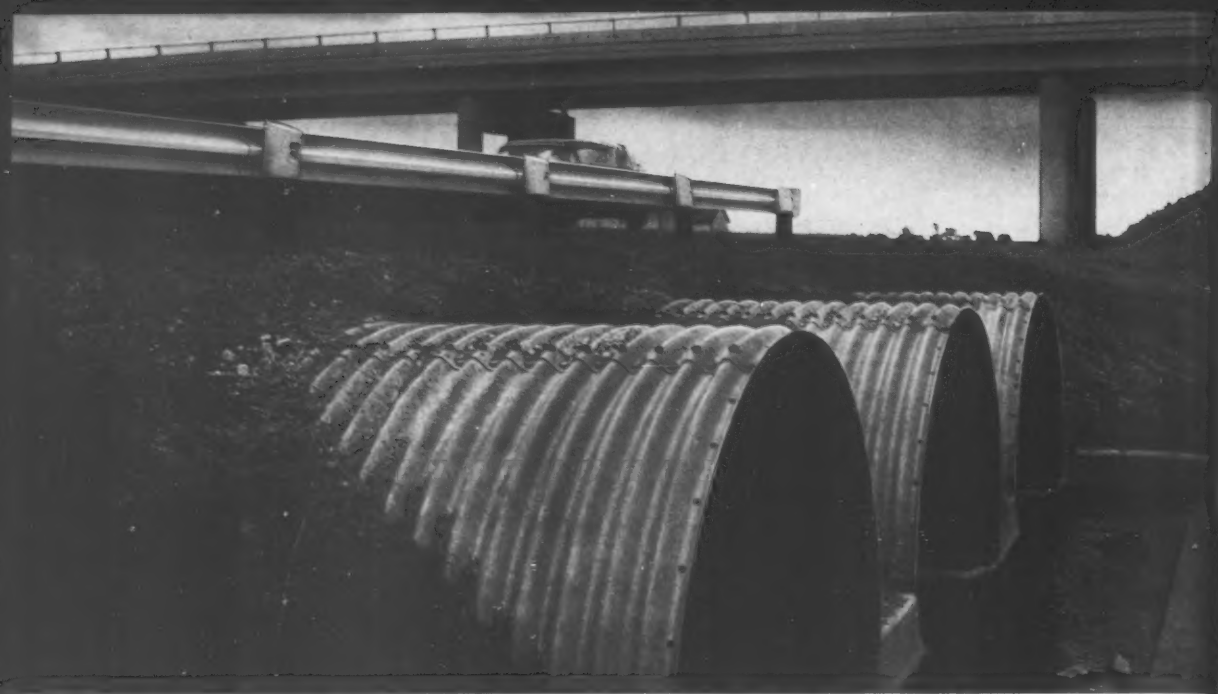

Three lines of Armco MULTI-PLATE® Pipe-Arch provide waterway for creek crossing new relocated freeway in Ohio.

Highway design is 50 years apart, yet...

Armco Drainage Pipe serves both relocated freeway and old highway

A relocated modern four-lane freeway now replaces the original 1907 highway. On both, Armco Corrugated Metal Drainage Structures were installed. The old road still carries local traffic, and the 50-year-old Armco Pipes are in good condition. On the new freeway, Armco Pipe again met all requirements.

This story is being repeated all over the country. *Proved durability* is influencing selection of Armco Drainage Structures for the country's newest highways, freeways and expressways.

Whatever the problem—capacity, limited headroom, strength, flexibility, durability—it's likely you'll find an easy and economical solution with one of the many types of Armco Drainage Structures.

For a quick, concise picture of the complete line of Armco Drainage Structures, send in the coupon for our new folder. Armco Drainage & Metal Products, Inc., 4389 Curtis Street, Middletown, Ohio.

Armco Drainage & Metal Products, Inc.
4389 Curtis Street, Middletown, Ohio

☐ Send me FREE copy of new 6-page data folder on Armco Corrugated Metal Drainage Structures.

Name_____

Address_____

Taken in 1923, this photo shows twin Armco Pipes installed in original highway in 1907.

ARMCO DRAINAGE & METAL PRODUCTS

Subsidiary of ARMCO STEEL CORPORATION

OTHER SUBSIDIARIES AND DIVISIONS: Armco Division • Sheffield Division • The National Supply Company
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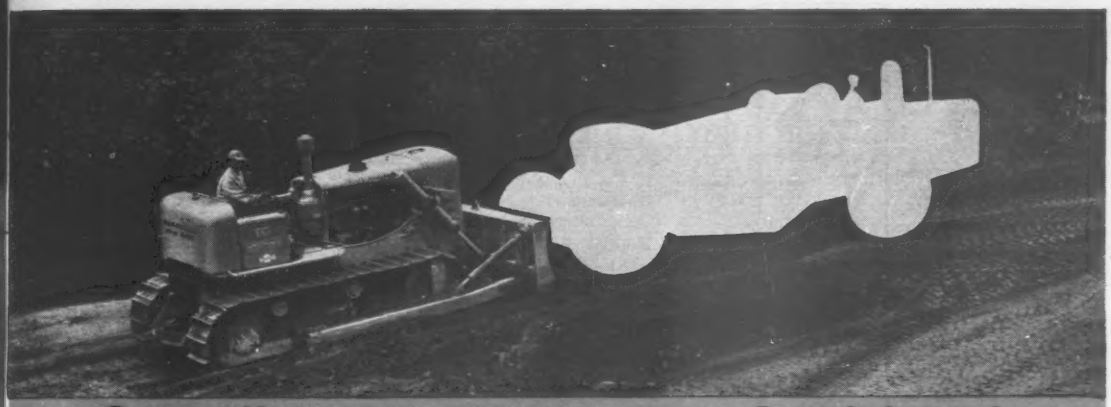
Same cut... same pusher
5% more dirt in 42% less time

DAY IN...DAY OUT, THIS ALLIS-CHALMERS 9½-YARD TS-160 OUTWORKS ITS LEADING COMPETITOR...AND DELIGHTS ITS OWNER*

This is no demonstration setup. It's a road job* where these two self-propelled scrapers worked every day . . . push-loaded by the same Allis-Chalmers HD-16 torque converter tractor. That made every loading cycle about as identical as they'll ever get. And hour after hour, the TS-160 moved out of the cut with a heaped load in an average of 42% less time than its 9-yard companion of another make. *This is extra work power you can turn into profit!*



Scraper X, heaped loads in 35 seconds, 9 yards heaped

TS-160, heaped loads in 20 seconds, 9½ yards heaped

* Further details on request

You may be surprised . . . may even challenge these facts. But facts they are, and we invite you to check them on *your* job, with *your* stop watch. Call your nearby Allis-Chalmers dealer now. He'll provide the TS-160 . . . when and where you say. *Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wis.*

...move ahead with **ALLIS-CHALMERS**...power for a growing world

PRESTRESSED

Placing of Amdek hollow box girders by means of Richmond Lifting Inserts with loads spread and equalized.

Lifting Inserts for Beams & Girders

Increased use of Prestressed Beams and Girders has led to the development of special inserts for lifting these units from casting beds, and placing them in their final position on the job.

Richmond Screw Anchors can be used where the mass of concrete provides sufficient distribution in width and depth to develop the strength.

Tyloops are used where the width and depth are sufficient for proper anchorage, where the unit has to clear reinforcing steel or other obstructions. Tyloops can be made in special shapes.

Extended Coil Lifting Tyscrus and 4 Strut Lifting Tyscrus are especially designed for thin walled Hollow Girders where the load distribution must be placed in the compression area of the prestressed girder.

All of these Lifting Inserts have actual ultimate strengths of at least twice their working loads in concrete at required lifting strength.

SCAB
Richmond Screw Anchor & Bolt Assembly.

LT2E
Lifting Tyscru with Extended Coil

LT4
4 Strut Lifting Tyscru

LE
Lifting Eye Bolt

TL4F
4 Strut Tyloop Flared

For more information about these and other Richmond Lifting Inserts send for the Richmond Data Book on Lifting Inserts. And if you have any specific concreting problems ask us about them.

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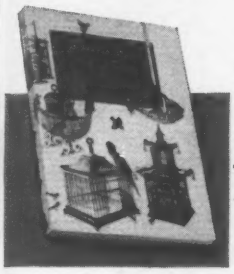
How an old story... told a new way... CREATES MORE BUSINESS FOR ENGINEERS

A SUPPLIER PUTS A TECHNICAL STORY IN POPULAR TERMS TO SPUR CONSTRUCTION OF NEW WATER SUPPLY SYSTEMS



This could be the best year ever to win contracts for new municipal water systems. Towns and cities everywhere may come to the point of inviting bids —with bond issues assured by alerted voters. Why?

Partly because *35 million people are now learning about the danger of water shortages;* and are more likely to act now than ever before.

For engineers who design and construct water systems, the water problem is an old story. But for most of America, it's still new. That's why the Cast Iron Pipe Research Association decided to talk to the country—as well as to engineers—in stating its case this year.

Since February, it has advertised in Reader's Digest. It has offered a free booklet, telling how to get local action on the problem. Already, it has had thousands of requests—each one signifying that another citizen, often a highly influential one, has been aroused to action!

Consider the enormous opportunity this unusual campaign offers engineering firms:

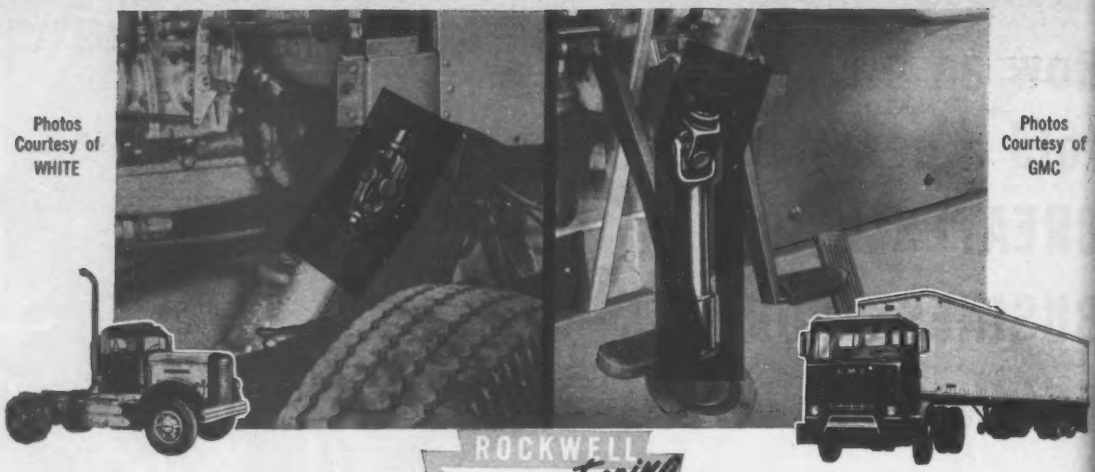
- **Never before has the need been explained to 35 million people (more than the number that read any other magazine or newspaper, more than watch the average nighttime television show).**
- **Never before has it been explained to so many of the *right* people. Nothing can match the Digest's audience in terms of education, income, position — and other qualities that give people influence in their communities.**

Aided by this stimulant, engineering firms can contract new business worth millions. And, in the process, national advertising will demonstrate once again—and in a medium ideally suited to the job—how it can serve the nation while it serves business as well.

People have faith in

Reader's Digest

Largest magazine circulation in the U.S.
Over 11,750,000 copies bought monthly



Photos Courtesy of WHITE

Photos Courtesy of GMC

ROCKWELL steering STANDARD

To "take power around corners" rely on the Keystone of Quality...

Photos Courtesy of KENWORTH

Photos Courtesy of REO

...select BLOOD BROTHERS Jointed Steering Shafts

On power steering assemblies for famous-make trucks, Blood Brothers Universal Joints "take power around corners" smoothly and dependably. They're widely used on manual steering assemblies too... for road-building and construction machines, farm tractors and self-propelled implements.

When you need universal joints to "take power around corners" — or provide for drive shaft flexibility — be sure to consult Rockwell-Standard. Our engineers will gladly assist you . . . and their experience may save money on your project.

K-1C

L6S, L6N

ROCKWELL-STANDARD CORPORATION

Blood Brothers Universal Joints

ALLEGAN, MICHIGAN

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B.F.Goodrich

B.F.Goodrich tires handle the tough jobs at mammoth Niagara Power Project

UNDER construction at Niagara Falls, N.Y., are the powerhouse, waterways, reservoir and intake—all part of the gigantic $720-million Niagara Power Project. Shown above: site of 110′ x 50′ excavation for one of the twin, 46′-wide, covered intake conduits. On the job: a fleet of trucks equipped with B.F.Goodrich tires and owned by Merritt-Chapman & Scott Corporation, largest contractor on the project.

These trucks haul ton after ton of rock and overburden from the excavation to the spoils area, work round-the-clock, 6 days a week, under severe operating conditions. In spite of this, B.F.Goodrich Rock Service tires are still going strong after 3,135 hours of service!

The Rock Service tread is specially-compounded to resist rock cuts and snags. Massive double-chevron cleats give extra traction in forward or reverse. Thanks to the special B.F.Goodrich FLEX-RITE NYLON cord body, Rock Service tires are virtually immune to heat blowouts and flex breaks. Result: you get longer tire life—more retreadable tires!

Other B.F.Goodrich products at work on the Niagara Power Project are conveyor belting, air hose, protective clothing and footwear. Maintenance and service programs for tires and industrial products are also in operation—all part of the new B.F.Goodrich Unified Contractor Program. No matter what your off-the-road job, B.F.Goodrich is ready to serve you—and help you save. Your Smileage dealer is listed under Tires in the Yellow Pages of your phone book. *The B.F.Goodrich Co., Akron 18, Ohio.*

Specify B.F.Goodrich Tubeless or tube-type tires when ordering new equipment

B.F.Goodrich *off-the-road tires*

$9,000,000 worth of bridges at Forest City and Mobridge, S. D.

Designers: Bridge Division of the South Dakota Department of Highways; Basic design by Bridge Engineer, K. R. Scurr. Final design and details by Missouri River Bridge Section of the Bridge Division, consisting of Roy W. Johnson, Chief Designer, and Structural Designers, Allen Fladeboe and Elek Kirchner.

Resident Engineer: K. O. Long, for foundations

Substructure Contractor: Massman Construction Co., Kansas City, M

Superstructure Contractor: John F. Beasley Co., Chicago, Muskogee,

Superstructure Steel Fabricator:
Vincennes Steel Division of Industrial Enterprises, Inc., Vincennes, Ind.

Girder Spans, Mobridge Bridge:
Mississippi Valley Structural Steel Co.

iggest bridges

etween the Mississippi and the West Coast

uilt solidly on USS Steel H-Piles

ridges span South Dakota's Oahe Reservoir—cost less than estimated

THESE TWO BRIDGES at Forest City and Mobridge are hailed as the largest single engineering and onstruction projects ever carried on in South Dakota, ith the exception of Oahe and Ft. Randall dams. he bridges are larger than any between the Missis- ppi River and the West Coast.

The Forest City Bridge is 4,583 feet long and the -foot roadway is 165 feet above the Missouri River ed. The total cost is approximately $4,715,000.

The Mobridge structure is 5,059 feet long, with a -foot roadway 140 feet above the river bed. The pproximate cost is $4,471,000.

Both bridges were constructed at costs substantially wer than original estimates. A major factor con- ributing to maximum economy was an advance urchase by the state of about 5,500 tons of USS teel H-Piles. The immediate availability of these ilings at the sites had a considerable influence on he bidding for both projects.

At the Forest City site, the 14-inch, 102-lb. USS -Piles were driven to a maximum depth of 140 feet nto Pierre shale using a steam hammer with 30,000 oot-pounds of energy. At the Mobridge site, the aximum length of piling is about 115 feet.

USS Steel H-Piles proved structurally and economically sound

The use of 5,500 tons of USS Steel H-Piles on these projects is further proof of their ability to provide a secure means of supporting foundations in unstable materials. They are readily handled in the field by ordinary equipment, are easy to splice, eliminate jetting, and withstand rough handling.

The great capacity of USS H-Piles for high unit loads, both vertical and horizontal, means fewer piles and fewer driving operations for a given load.

For more detailed information about the lasting safety and economy of USS Steel H-Piles for every type of foundation job, contact our nearest sales office.

USS is a registered trademark

USS

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Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Export Company

United States Steel

ridge and Forest City Bridges are similar in design and together take more than 8 thousand tons of fabricated steel and 5,500 tons of USS H-Piles.

Short-span concrete slabs cost less with Milcor Ribform

Ribbed high-tensile steel form is stronger than ordinary corrugated patterns

Ribform is a permanent, rigid base for concrete floor and roof slabs poured over spans up to 5′-0″.

It goes down fast—is easy to install over pipe trenches or in other inaccessible locations where it is impractical and expensive to strip wood forms. Temporary bracing of joists is unnecessary. Scaffolding is eliminated; Ribform is a safe working platform.

Ribform uses as much as 20% less concrete than flexible types of centering. The slab is poured and finished in one operation. The rigidity of Ribform permits monolithic finishing — eliminates costly topping.

See Sweet's, section 2h/In—or write for catalog 245 giving complete details.

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Reader Comment

Frames Must Be Ductile

SIR—Since the City of Los Angeles is located in an active earthquake region, the Department of Building and Safety has always been on the alert to keep abreast of latest requirements for earthquake-resistant design of structures.

Two recent developments have intensified research in this field: (1) The Mexico City earthquake of 1957 gave engineers firsthand information on the action of major structures during an earthquake of considerable magnitude. (2) The unlimited Height Building Ordinance adopted by Los Angeles in 1958 requires a much more careful determination of earthquake resistance than the previous 13-story height limit required.

The Structural Engineers Association of California has for years been conducting research in the field of earthquake-resistant design. From this work has come numerous recommendations on which building codes are founded. Recently, the association set forth design requirements for multistory frames (ENR Mar. 19, p. 56).

Following through on this recommendation, Los Angeles now requires that the structural frame used to resist earthquake forces be composed of material having the ductility of structural steel. Applicable to all buildings over 13 stories or 160 ft in height, the new regulation states that materials or combination of materials not having the ductility or the energy-absorption qualities of ASTM A7 structural steel are not acceptable.

This is an important design requirement for engineers and architects throughout the U. S. who design buildings for Los Angeles.

G. E. MORRIS
Superintendent of Building
Department of Building and Safety
Los Angeles, Calif.

Against NY Rezoning

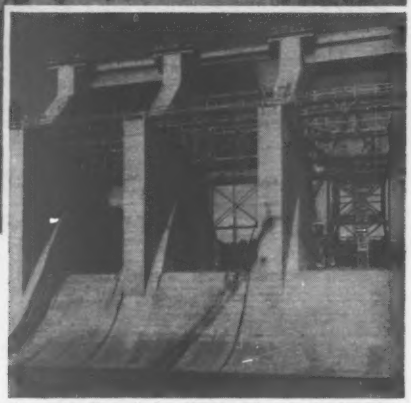
SIR—Permit me to take exception to your editorial, "Recognition and Public Service," (ENR April 30, p. 104).

The proposed rezoning plan entirely ignores the fact that New York City, except for Richmond and parts in Queens, consists of built up areas. Existing structures do not conform to the proposed zoning plan. Hence to exe-

Engineering News-Record welcomes expression of opinions from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

• Providing the Steelwork for Today's Modern Dams

Equipment totaling $4 million was supplied by Yuba Manufacturing Division for the huge Ice Harbor Dam project on the Snake River, Washington.



Ten giant Yuba-built spillway tainter gates, 50 feet wide and five stories high, weigh 145 tons each.

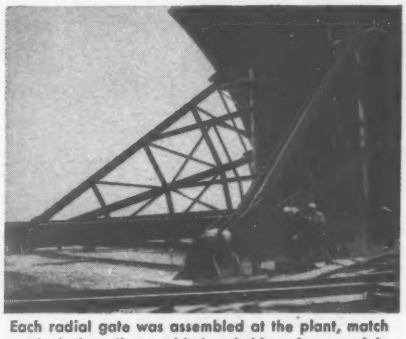
• From Forebay to Tailrace
• Design • Fabrication • Erection

The giant radial gates shown here, the massive trash racks, the draft tube, traverse and intake bulkheads, and a number of other steel fabricated components totaling 44 in all, were produced by Yuba Manufacturing Division.

This enormous project of the Army Engineers is typical of the many dam construction jobs in which Yuba has been a major participant. The reasons: decades of experience in this specialized field; real know-how of its skilled personnel; large, fully-equipped production facilities—East and West.

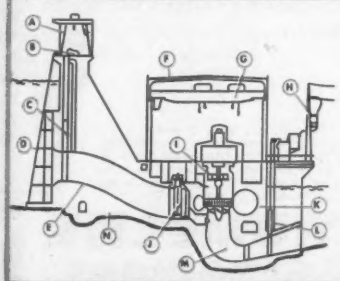
Where user and contractor want relief from coordinating production, delivery and installation, they can call on Yuba to handle the complete job as a package responsibility—from forebay to tailrace—through design, fabrication, erection.

Ask for Bulletin No. HY-51, describing Yuba's hydroelectric equipment and services, or ask for a sales engineer to call.



Each radial gate was assembled at the plant, match marked, then disassembled and shipped on gondola cars to the site—four cars to a gate!

Call on Yuba for the complete package responsibility...



- (A) GANTRY CRANES
- (B) HOISTS
- (C) INTAKE GATES
- (D) TRASHRACKS & TRASH RAKES
- (E) CONDUITS, LINERS AND PENSTOCKS
- (F) STRUCTURAL FABRICATION
- (G) BRIDGE CRANES
- (H) POWERHOUSE STRUCTURES
- (I) PIT LINERS
- (J) BUTTERFLY VALVES
- (K) SPIRAL CASES
- (L) DRAFT TUBE GATES
- (M) DRAFT TUBES
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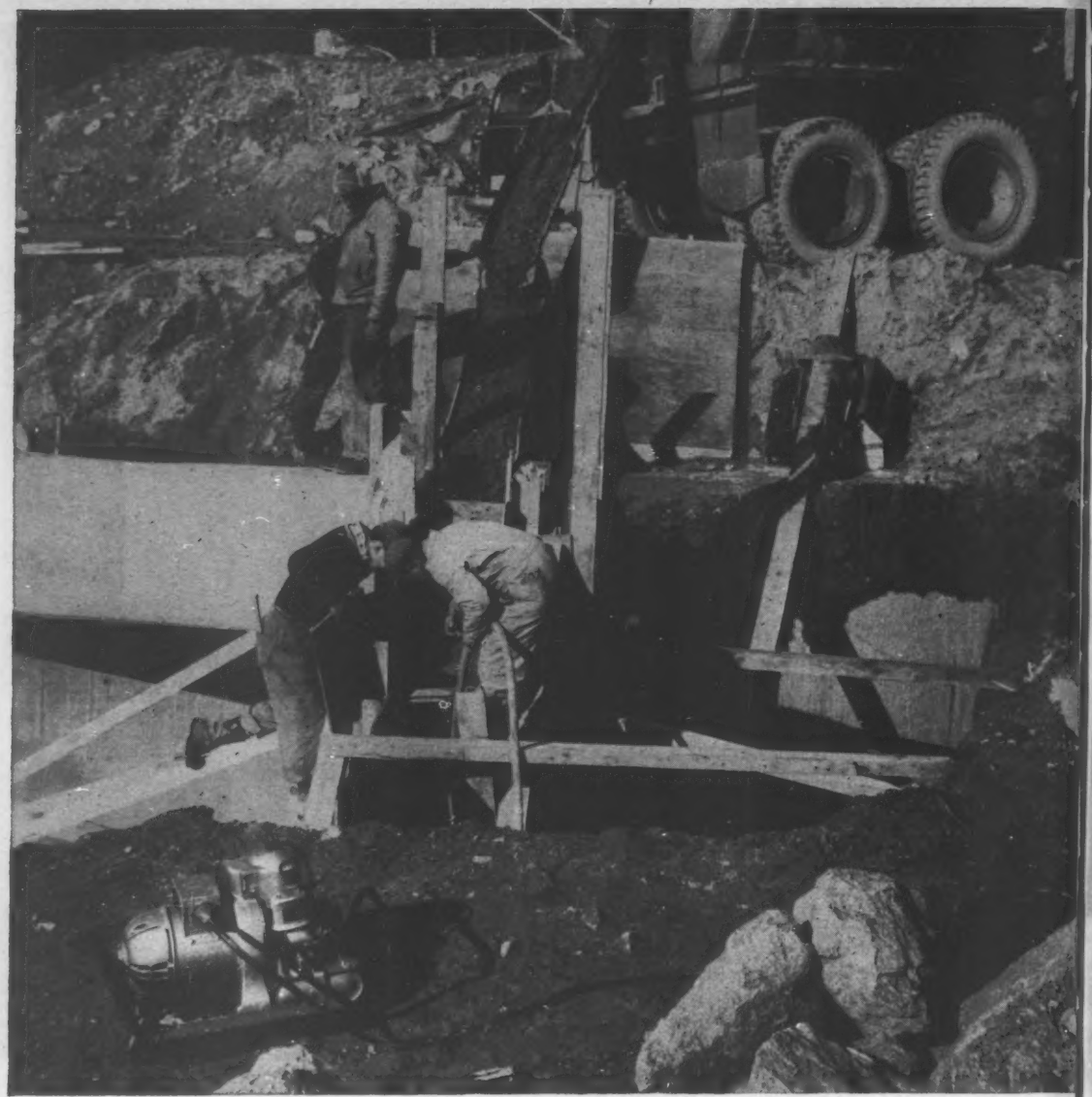
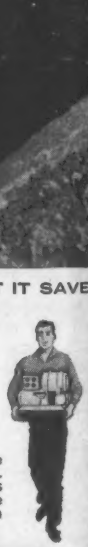


USED BY MEN WHO BUY EQUIPMENT FOR WHAT IT SAVES

How contractors cut costs

The picture tells the story . . . an interesting story to any cost-minded contractor. Look at it carefully. One man . . . is operating the Homelite Concrete Vibrator. He operates it with power from a Homelite Carryable Generator. Look at the picture again. The generator is set up for operation in a convenient spot. No special scaffolding is necessary. No extra expense involved. It's savings all along the line . . . savings in time, labor, and work. And it's savings with a bonus. Other men can use the generator at the same time to operate standard universal power tools or brilliant floodlights.

Ask for free on-the-job demonstration of how to save with Homelite Concrete Vibrators and Carryable Generators.



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Here's many construction dollars saved for the owner* and a faster return on his investment from earlier sales dollars.

Building? MVSS has complete fabricating and erection divisions in 7 cities. All divisions can be integrated just like this to rush your job through to swift completion *... anywhere ... anytime!*

*Name and address on request.

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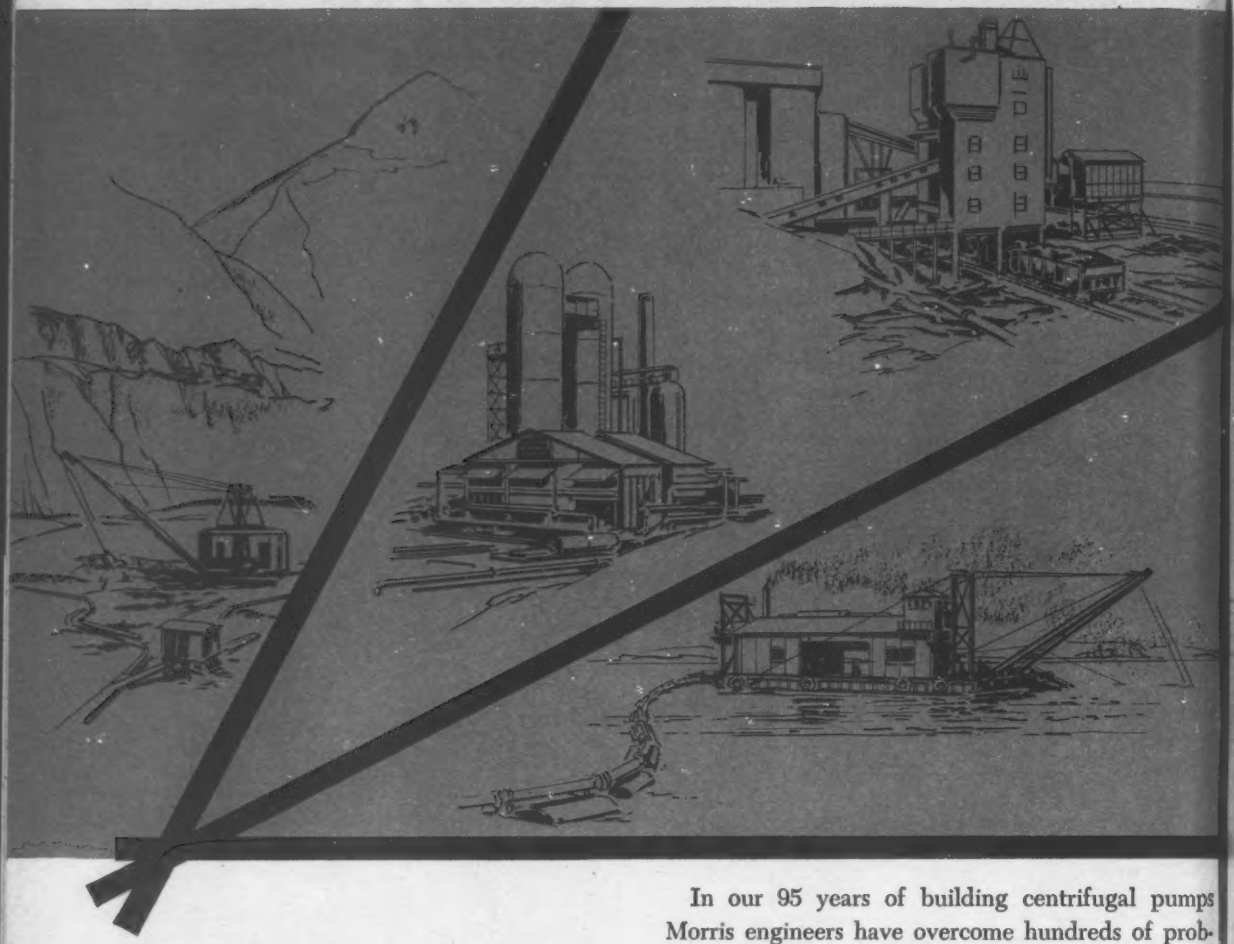

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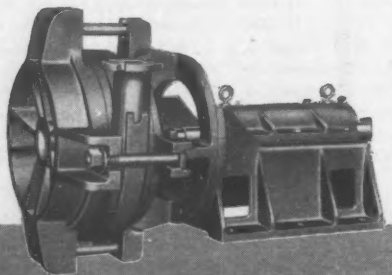

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cute this plan so that New York becomes pretty, we must demolish most of it.

The planners estimate it will take twenty five years to accomplish the rebuilding. But who will do it? Where will the billions of dollars come from? You cannot count upon private enterprise—what incentive is there to demolish a building and get only 60% floor space in return?

Aside from that, the proposed plan sets aside specific areas for particular development, it places a premium on land that may be desirable for, say, office building or manufacture. This will result in prohibitive land values. Indeed many of our present skyscrapers would never have been if we had such zoning laws.

As an engineer, I am always out for public service, wherever the public is truly to be served. But in this instance, it is obvious that the public will suffer strangulation of economic building development. Therefore, let me caution engineers from supporting this measure just because it has been prepared by an engineer, for it will reflect badly upon the whole profession.

PERRY W. ETKES
Consulting Engineer
New York City

Editor's Note:—The proposed zoning law for New York City would apply only to new structures—not those already standing.

For Your Calendar . . .

Wood Industries Conference, Portland, Sept. 10-12. Write: Louis P. Grownev, Arrangements Committee, c/o Pacific Power & Light Co., 404 Public Service Building, Portland 4, Ore.

Institute of Traffic Engineers, annual meeting, Commodore Hotel, New York City, Sept. 13-17. Write: Institute office, 2029 K St. N. W., Washington 6, D. C.

Malleable Founders Society, industry meeting, Hotel Sheraton-Cleveland, Cleveland, Ohio, Sept. 18. Write: Malleable Founders Society, 781 Union Commerce Building, Cleveland 14, Ohio.

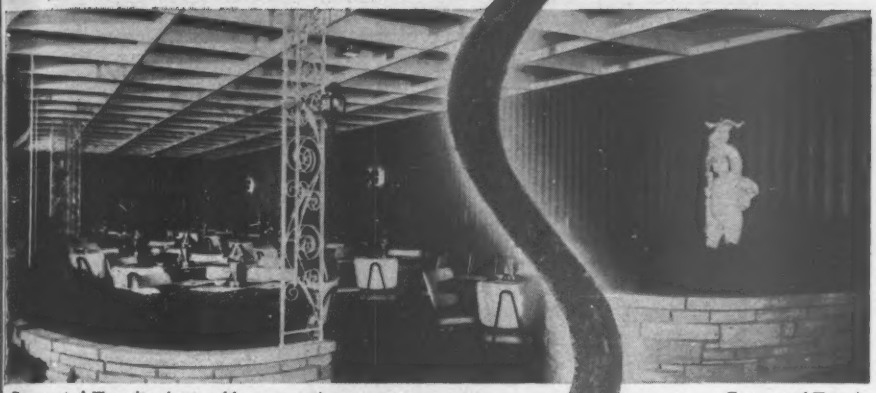
Public Works Congress and Equipment Show, Seattle, Wash., Sept. 20-23. Write: American Public Works Association, 1313 E. 60th St., Chicago 37, Ill.

Steel Founders' Society of America, fall meeting, The Homestead, Hot Springs, Va., Sept. 21-22. Write: Steel Founders' Society of America, 606 Terminal Tower, Cleveland 13, Ohio, attn. George K. Dreher, Market Development Director.

Conference on Planning and Design of Urban Helicopter Facilities, Institute of Aeronautical Sciences Building, 7660 Beverly Blvd., Los Angeles, Calif., Sept. 21-22. Write: Los Angeles Chamber of Commerce, Aviation Dept., 404 S. Bixel St., Los Angeles 54, Calif.

Associated General Contractors, midyear meeting of governing and advisory boards, Hotel Muehlebach, Kansas City, Mo., Sept. 21-23.

International Conference of Underground Town Planning and Construction, Brussels, Sept. 21-25. Write: M. P. LaVedan, 94 Rue St. Lazare, Paris 9, France.



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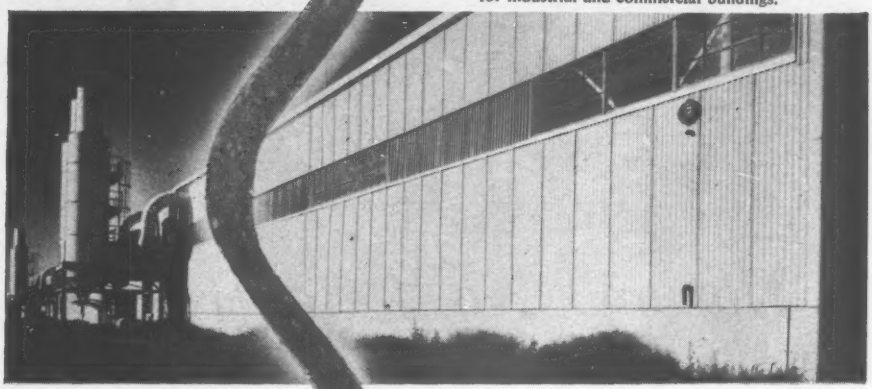

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Glen Canyon Dam will be built for the U.S. Bureau of Reclamation. *Prime contractor:* Merritt-Chapman & Scott Corp.

They bolted the face of this 700-ft cliff

This sheer canyon wall will soon form one side of Glen Canyon Dam which will arch 1500 feet across the Colorado River in Arizona. The dam when completed will store water to generate electric power for a five-state area. Here you see construction workers, hundreds of feet above the river, drilling holes in the rock face of the cliff with Bethlehem hollow drill steel.

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ENGINEERING NEWS-RECORD

Vol. 163, No. 9 August 27, 1959

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THE CONSTRUCTION WEEK

CONTRACTOR SQUEEZE—Highway construction bid prices fell 2.7% in the second quarter, Bureau of Public Roads says. It was the largest quarterly drop since 1954. But the drop doesn't indicate a down trend in roadbuilding costs, says BPR. Rather, it "indicates continuance of a trend of stabilization in prices." Meanwhile, ENR's Construction Cost Index is at a record high.

PISCATORIAL PERVERSITY—Some fingerling salmon are apparently braving the turbines at Idaho Power Co.'s Brownlee Dam on the Snake River, disdaining a safer way downstream that cost Idaho Power Co. $5 million (ENR Aug. 14, 1958, p. 46). Fishery technicians speculate that small numbers of the fish now appearing in sampler traps just below the dam are swimming underneath a 120-ft-deep barrier net upstream, designed to keep them out of the turbines.

WASHOUT MARS TUNNEL TESTS—Big-scale flow tests attempted in one of Fort Randall Dam's flood-control tunnels last week were only partly successful (ENR Aug. 20, p. 28). Before all the scheduled tests were completed, a strut supporting instruments inside the tunnel gave way to water somewhat more forceful than Army Engineers hydraulics experts had bargained for.

ALUMINUM BRIDGE STILL TO COME—The Reynolds-Baroni type sheet-aluminum bridge may finally win a clean bill of health in a report expected from New York University next month. Plans to build the first one in DeKalb County, Ala. (ENR Oct. 16, 1958, p. 25) were changed when Reynolds Metals Co. temporarily withdrew its offer. Reynolds reportedly found cracks due to stress concentrations around a few bolt holes after tests equivalent to 35-40 years of service. Redesigned components have since been under tests simulating 100 years of service.

GEYSER POWER ON COAST—Construction began last week on the first natural-steam-powered electric generating plant in this country. Magma Power Co. and Thermal Power Co. started work on wells that will supply geothermal steam for a 12,500-kw generating station to be installed by Pacific Gas & Electric Co. near Healdsburg, Calif.

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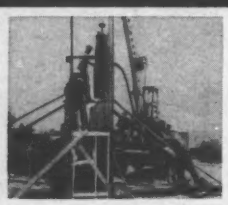

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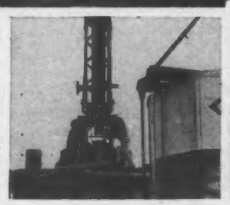

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WASHINGTON OBSERVER

- **Self-financing for REA?**
- **Proposed: Natural Resources Council**
- **Bigger grants for sewage disposal plants**

● **Public works advocates are already preparing for the next session of Congress.** Most of what is to be done is about completed for this year (see p. 23). What is in store for the next election year is significant to the construction industry.

Extending the idea of self-financing of revenue-producing public works ranks high in Congressional thinking. This year saw the creation of a bond-financing law for the Tennessee Valley Authority. Similar efforts will be made to give some measure of fiscal autonomy to other agencies.

Take the Rural Electrification Administration. Now the agency gets loan authority from Congress each year to disperse to co-ops for steam plant and transmission line construction.

Last week a White House-backed plan to create a $3-billion revolving fund was presented to Congress.

The legislation would permit REA to use money from repayments of loans to finance future loans. Congress would still formally okay the loan program, but would be faced with the reality that REA had money in the till. Congress would thus do less worrying about whether the proposals were fiscally prudent.

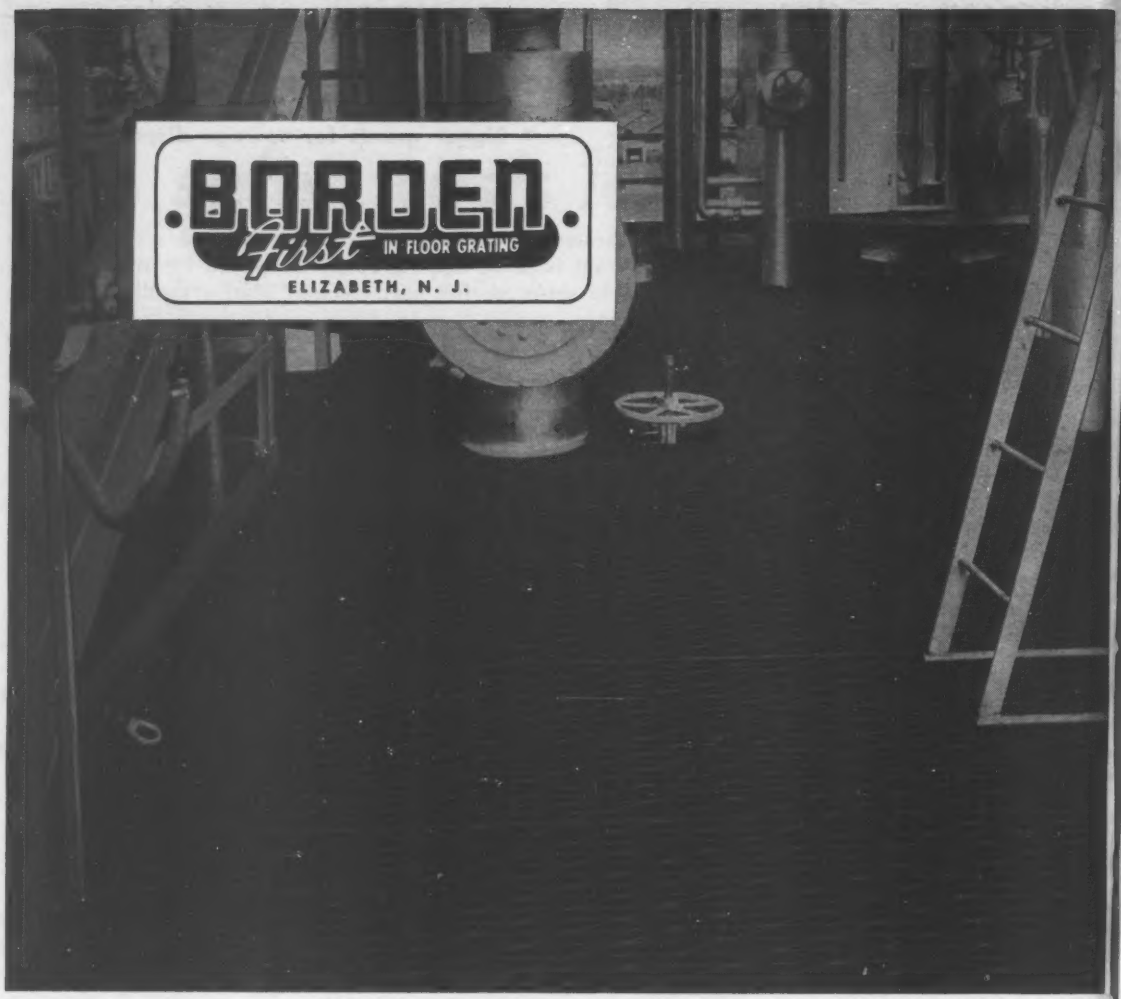
Proponents of a Columbia River Corp. in the Northwest are taking a cue from the TVA and REA developments. Supporters of legislation sponsored by Sen. Richard Neuberger (D., Ore.) feel they should attempt to write some kind of self-financing bill.

● **A "Natural Resources Council" is being pushed. The idea is to bring under one roof water resources policies and programs.** Sen. James E. Murray (D., Mont.) has 31 sponsors of legislation to establish such a council, with a joint Congressional committee counterpart. The organization would be policy-making, not legislative, and would be patterned after the President's Council of Economic Advisers with its Congressional Joint Economic Committee counterpart.

● **Grants for sewage disposal plants are in for session-end confusion.** The House of Representatives has passed legislation increasing federal grants in the future from the present 10-year, $50-million-a-year program. The House would increase federal grants to municipalities to $100 million. A Senate public works subcommittee informally, and by voice vote, reduced that figure to $60 million, estimating that President Eisenhower would veto the larger amount, but accept the lesser.

A review is now in progress, following the success of Sen. Eugene McCarthy (D., Minn.) in getting eight members of the 15-man Senate committee to sign a report recommending an increase to from $80 million to $100 million. The Public Works Committee is now faced with a subcommittee recommendation on the one hand and, on the other, a "minority" report signed by a majority of its own members.

The Senate will make the decision. Whatever it votes, the House of Representatives will take. And observers feel the figure will be somewhere between $60 million and $100 million.



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Congress: Key Bills Still Hanging

- **Highways: Financing schemes come and go, but the problem remains.**
- **Housing: Green light from Senate, yellow from House. Red from Ike?**
- **Labor: Both sides predict they'll write a bill.**

This week, as the first session of the 86th Congress moved toward an uncertain adjournment date, four pieces of legislation vital to construction awaited decision. Here's how things looked early this week, amidst intense backstage maneuvering and pressures.

• Labor—Congressional conferees this week were tackling the toughest part of reconciling the House and Senate labor bills. That includes new Taft-Hartley rules for secondary boycotts, organizational picketing and federal jurisdiction—all key issues in the legislative debate. The easy part—compromise agreements on union democracy and anti-racketeering—is over.

The conferees hoped to reconcile the tougher rules of the House's Landrum-Griffin bill with the Senate's Kennedy-Ervin bill.

Both sides predicted a compromise would be reached. But this could require more concessions than the Senate will be willing to make.

The conferees leaned toward a tougher bill in working through the first five sections. These covered a "bill of rights" providing for secret ballots, the right to speak out in union meetings and other democratic practices for union members. They also agreed on rules requiring union leaders and employers to file financial reports, and on broad powers for the Secretary of Labor to investigate such reports.

Among the areas still open for compromise were the construction labor amendments. The Senate bill would allow unions to make working agreements, but only after the union is certified without a prior election and only if there has been a bargaining history. The House bill doesn't ease the current 30-day union shop restriction.

One possibility involves a trade: the tougher House boycott and picketing restrictions for the Senate's building trades amendments.

• Highways—A solution to the Interstate highway program's financial plight is still ensnarled in political maneuvering. New schemes, old schemes and alternate schemes for raising money are still coming—and going.

After rejecting one financial solution proposed by the House Ways and Means Committee, Public Works Committee members have been fighting among themselves over the new money-raising plan offered by Ways and Means. Not only are Public Works members unhappy over the Ways and Means proposal to hike fuels taxes by one cent a gallon for a 21-month period, but members are battling over a proposal to get a declaration of intent from Congress to reimburse states for toll and freeways included in the Interstate system.

Speaker Rayburn, however, has told the Public Works Committee to reach an agreement or the financing portion of the bill will be split and put to the House for a separate vote. Committee Democrats met with Mr. Rayburn in an effort to swing his support to a new financing plan that would levy a ½-cent-a-gallon fuels tax on motorists for only one year and immediately earmark additional excise taxes for roadbuilding.

Regardless of what plan Congress finally approves to bail out the road program this year, it is sure to leave a trail of disgruntled legislators. And it seems sure to shift more importance to 1961, when Congress plans to take a new look at the long-range roadbuilding financing plan based on recommendations due from the Bureau of Public Works on who is benefiting from the new highways.

• Housing—The Senate voted 71 to 25 last week for a new, scaled-down housing bill to replace the earlier version that Mr. Eisenhower vetoed.

As this week began, the House was still in a quandary. Democrats hoped for unanimous consent to suspend rules and bring the measure to the floor.

Should the Republicans balk, however, the bill could get bogged down in the Rules Committee.

For the time being, the House parliamentary situation overshadows in importance the terms of the legislation. Major features of the bill are:

- $8 billion of new mortgage insurance authority for the Federal Housing Administration; lower down payments on FHA-insured homes.
- $500 million for urban renewal, plus $150 million that may be allocated at the President's discretion.
- $100 million for new direct loan programs that Mr. Eisenhower does not want—$50 million each for college classrooms and for special housing projects for the aged.
- Authority to build 37,000 more units of public housing—another feature the Administration dislikes.

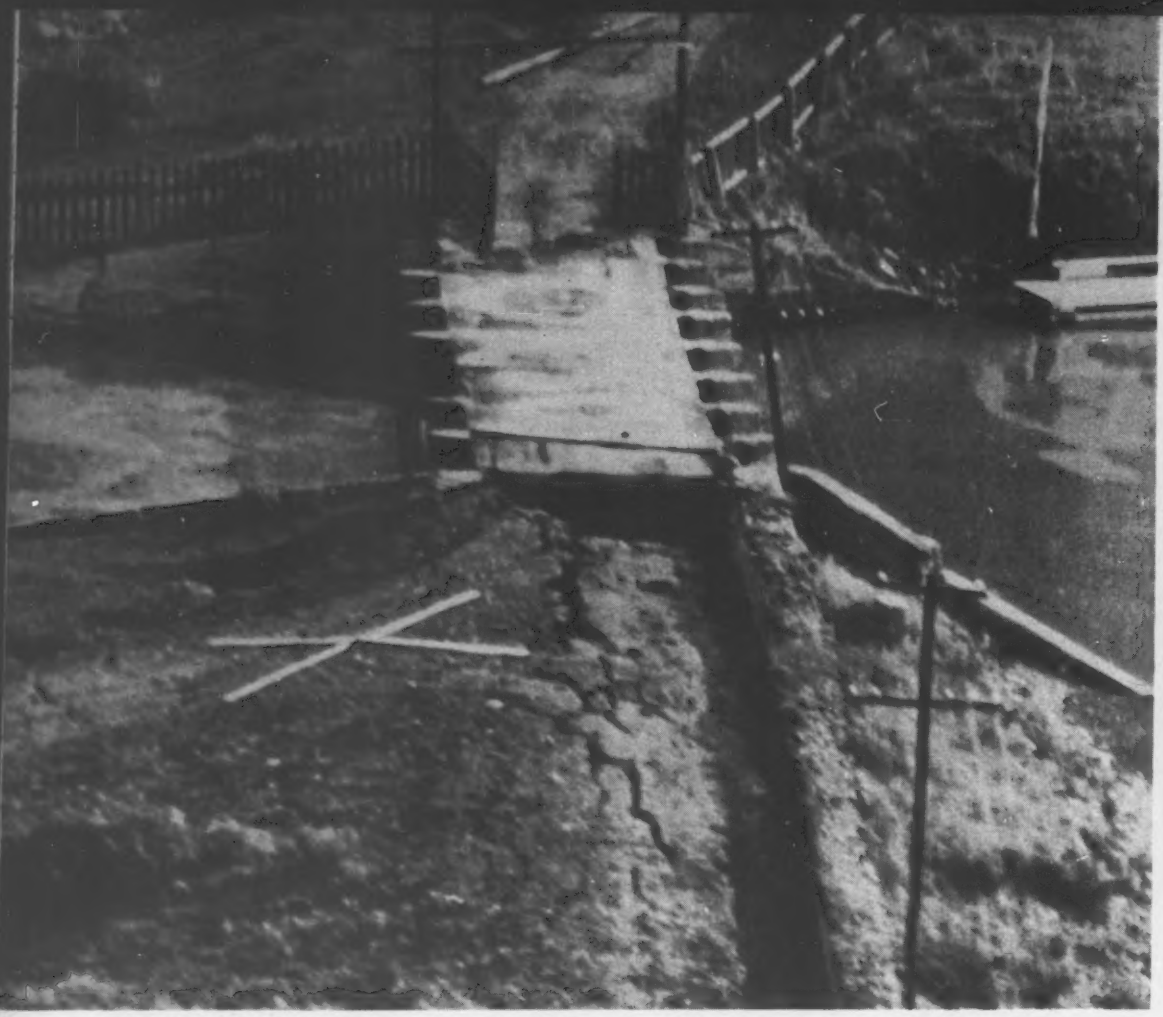
• Military construction—Senate committee action last week restored more than half the money cuts made by the House in the military construction appropriation bill.

As submitted for floor debate and decision, the Senate version called for $1.428 billion, up $143 million from the House bill and just $135 million less than the Defense Department originally asked for.

Money amounts were increased as expected by the Senate Appropriations Committee, which had held additional hearings for armed forces spokesmen after the House passed its bill. The committee upped the construction funds for the regular forces to $279 million for the Army, $226 million for the Navy and $803 million for the Air Force. Construction for reserve components also was increased more than $13 million, to $73 million.

House and Senate versions agreed on the big slug of money going to construction of missile facilities: $413 million for Air Force projects in North America and $118 million for Army Nike installations—$34 million in continental U.S., $84 million overseas.

Conferees appointed by the two houses will settle the differences over other items. Final compromises were expected to be closer to the higher Senate figures than to the minimum amounts voted by the House.



Although cracked after the quake, rolled-earth, concrete-core dam stayed in service.

Major Quake Fails to Breac

A 44-year-old concrete-core earthfi
dam withstood the severe earthquake i
southeastern Montana last week. I
cracked and shifted, but remained in
tact.

The quake damaged highways in th
area and caused landslides that kille
12 or more persons and injured scores

**Hebgen Dam was jarred for severa
hours by earthshocks with a maximu
intensity reported by the University o
California as 7.8 on the Richter scale.**
That compares to 7.5-7.75 for the 195
Bakersfield quake and 8.25 for Sa
Francisco's famed 1906 earthquake.
Aftershocks in last week's quake
ranged from 6.0 to 6.75 during th
night and early morning. The dam i
on the Madison River, west of Yellow
stone National Park.

The initial shock caused the wate

◀ Cave-in dunked half-mile of road

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highway was one piece before last week's temblors.

Hebgen Dam, intact after quake.

ac lontana Earth Dam

in the reservoir to oscillate violently. Great quantities sloshed over the dam and reportedly lowered the reservoir level two feet. On a reverse movement of the water, the upstream toe of the dam could be seen. The shock also caused the east abutment (spillway side) of the dam to settle eight to ten inches.

Hebgen Dam rises 87.3 ft from the stream bed. It has an 8-ft-thick concrete core wall that goes down an additional 36 ft, thickening to 90 ft at its bedrock foundations. Rolled earthfill embankment enclosing the core wall extends 237 ft downstream and 265 ft upstream at stream-bed level. The upstream slope is paved with two feet of rock. The dam is 718 ft long at the crest.

The dam impounds water for downstream power generation but has no powerhouse of its own.

Montana Power Co., owner of the dam, reports cracking on the order of 1½ in. at the crest of the core wall and some minor leaks.

The company expects to lower the reservoir to facilitate a thorough inspection. If the concrete core is badly fractured, it may have to be grouted.

Earthfill dams are not built with concrete-core walls today because of the danger of cracking.

Major concern now is a huge earth and rock embankment that blocks the river about five miles below the dam. It was brought there when the quake dropped 5 million cu yd of material from the mountainside onto State Highway 1 and across the stream bed.

The embankment is causing formation of a lake from the normal Hebgen Dam spillway discharge. It's estimated that the lake could hold 50,000 acre ft, but it might build up enough head to wash out the embankment and cause great damage downstream.

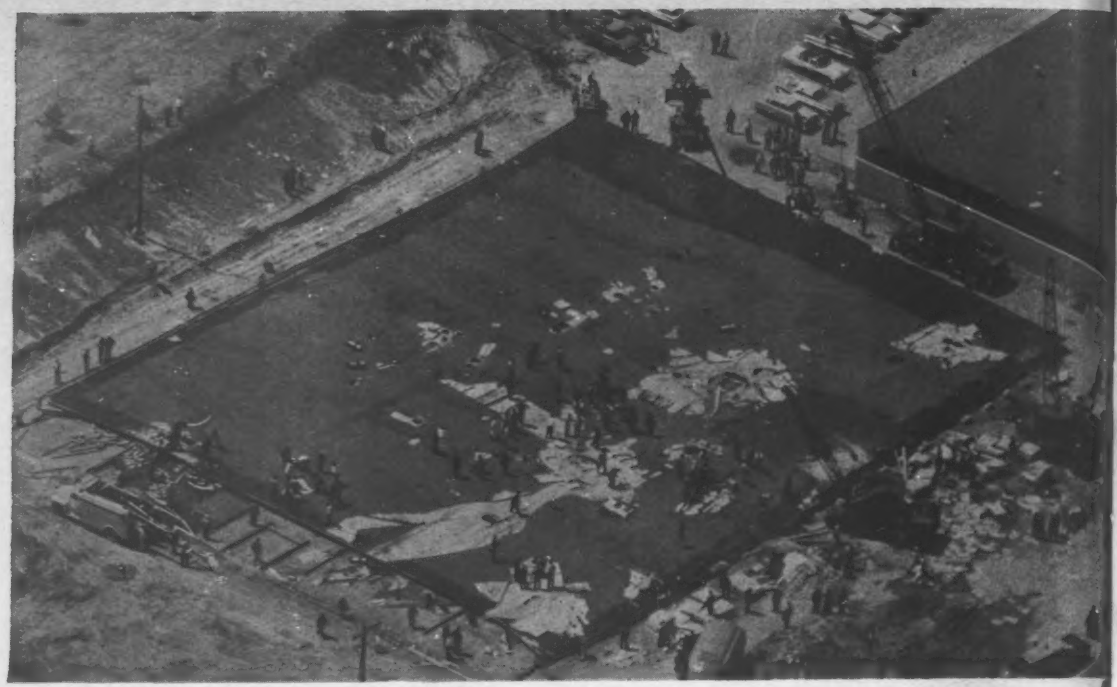
To cope with this threat, the Corps of Engineers has set up an area office at West Yellowstone. The Corps is acting under its emergency flood control powers, exercised for the first time because of an earthquake.

A Corps official, Wendell E. Johnson, investigated the embankment this week, after helicopter landing.

Last Sunday the Corps moved heavy earthmoving equipment to the downstream toe of the embankment and proceeded to bulldoze a road up the face so the equipment could operate from the top.

It is estimated that the lake could fill within 20 days. Two possibilities were being considered: lowering the height of the embankment by pushing the crest material into the lake; or cutting a trench through the embankment.

In either case, the objective would be to lower the head against the embankment to reduce the chance of failure. Water could then flow over or through the embankment, sparing the town of Ennis and a power plant downstream.



Remember this failure? Here's how they're . . .

Making Sure It Won't Happen Again

The designer and contractor replacing the Westbury, L. I., industrial building that tilted over in May (picture) are making sure the failure won't be repeated.

The entire structural steel frame and roof of the one-story, 25,000-sq-ft building keeled over during construction (ENR May 14, p. 29). The roof had been completed, but work had not yet started on the walls. One worker was killed and several others were injured.

The failure appears to have been due to inadequate resistance to sidesway.

Now the building is going up again. But this time some structural changes have been made.

The original structure was designed with continuous girders atop the columns and continuous beams on top of the girders. It had knee braces only between girders and columns.

The new structure has a knee brace between columns and beams as well as girders. There are now eight lines of knee braces, four lines in each direction, compared with two lines in one direction in the original structure.

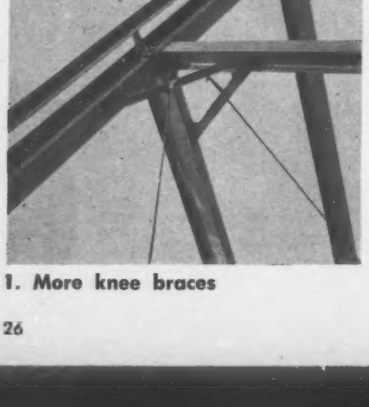
Where the original base plates were set on steel shims, the new ones rest on leveling plates.

Two lines of "I" beams now run around the periphery of the building. They conceivably could draft the curtain wall as an additional stiffener.

The building that collapsed had been designed to meet the town code. Th engineer for the structure had not bee responsible for supervision.

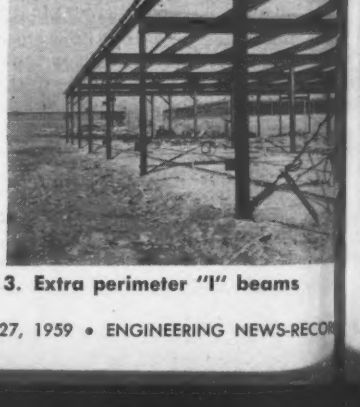
Building-code requirements ju made by the Town of Oyster Bay no require a professional engineer or reg tered architect to inspect constructio Work must stop "if for any reason he ends his supervision.

The Westbury building is being co structed for the Sem Co., Westbur N. Y. It is 175 x 143 ft in plan, an about 15 ft high. Jamco Constructio Co., Westbury, is general contracto Kurtz Iron Works, Mineola, N. Y., steel fabricator and erector. Charles Catalano, Elmont, N. Y. engineer, the designer.



1. More knee braces

2. Leveling plates under columns



3. Extra perimeter "I" beams

Air Conditioning System Is Built Into Columns

Two new office buildings are cooled by air that comes from within the structural columns.

The idea is being used in the Lafayette Square Building, Buffalo, N. Y., and the East Ohio Building, Cleveland.

Structural columns of both buildings are made of reinforced concrete. If separate air-conditioning systems had been installed, the combined space loss would have been considerable.

The air-conditioning equipment is placed on the roof of the building and blows down. Air ducts are larger near the top of the building—where columns are smaller—than on the lower floors.

The ducts are telescoped within the structural column. In the Buffalo building this was accomplished by using a U-shaped reinforced concrete structural column, attaching Z-bars and then welding a plate onto the Z-bars at the open end of the column. The opening within carries air blown from above. The ducts vary from 8 in. sq to 14 in. sq. In the East Ohio building, round ducts were placed in square openings that were built into the concrete columns as the columns were formed.

System was developed by Tishman Realty & Construction Co., Inc.

Monorail Sings the Blues After New Orleans Vote

Plans for a monorail transit system for New Orleans went off the tracks last week when the City Council killed a franchise proposal by a four to three vote.

Monorail of Louisiana, Inc., wanted to build a 16-mile, $32.5-million, two-track system between New Orleans and Moisant Airport (ENR Mar. 5, p. 27).

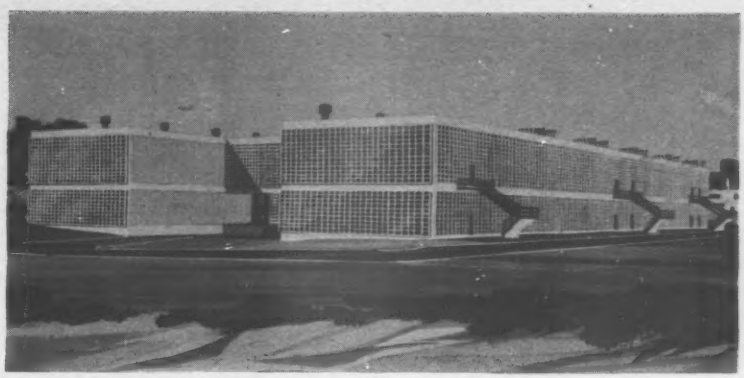
Opponents of the monorail system argued it would lower property values and jeopardize the existing seven-cent fare on street-cars and buses in New Orleans.

Congress Okays Cash for Federal Fallout Shelter

Congress has approved $2.4 million for construction of a prototype federal "relocation" fallout shelter at Denton, Tex. The House, which had originally rejected the project, agreed to that figure last week after the Senate approved the full $2.7-million Administration request.

The shelter would be the first of eight planned by the Office of Civil and Defense Mobilization.

The prototype shelter will be a two-level underground structure, about 140 x 160 ft in plan.



Plant Has 10,000 Popout Windows

A chemical manufacturing plant—specifically designed to minimize injury and destruction in case of explosion—will have 10,000 plastic popout windows.

The $7-million facility is being built for Parke-Davis & Co. in Holland, Mich.

When plant explosions occur in buildings with conventional glass windows, there is greater injury and destruction through flying glass and debris than from the blast itself, the plant's engineers say.

Plastic windows eliminate the danger of flying glass, and the popout feature provides a pressure release for the force of the blast.

The shell of the new chemical plant is 80% window area. Plans also call for the windows to be "bowed out" upon installation for even greater pressure release properties.

The two-story structure will contain 120,000 sq ft of floor space and is in the shape of an "H." It consists of four separate manufactured units at the points of the "H." The "cross-bar" serves as an area for utilities and material storage.

The building will be constructed primarily of prestressed, precast concrete. The sloped roof will be of concrete. Steel will be limited to necessary grating and the floor between stories.

The structure was designed by the Parke-Davis Engineering Division with A. M. Kinney, Inc., Cincinnati, as consulting engineer. Darin & Armstrong Co., Detroit, is the general contractor. Completion is expected late next year.

India to Get Aluminum Industry

Kaiser Aluminum & Chemical Corp., Oakland, Calif., and the Birla Industries of India plan an integrated aluminum-producing industry in India. The two firms organized Hindustan Aluminum Corp. Ltd. as a joint venture.

It will invest $30 million to build and operate an aluminum-producing plant with an annual capacity of 20,000 metric tons, and related bauxite and aluminum facilities.

Kaiser's interest in the venture will be 27%; the remainder will be invested by Indian interests. This is the largest investment by an American firm in a joint venture with an Indian company. Hindustan Aluminum is seeking $15.8 million in loans from the U. S. Export-Import Bank.

The facilities are expected to start operating in 1962. They will be built by Kaiser Engineers Division of Henry J. Kaiser Co. The project will be located at Rihand Uttar Pradesh, a province in Central India, to take advantage of the power provided by Rihand Dam.

Rihand Dam was planned to help improve the living conditions in the particularly poor eastern and southeastern area of Uttar Pradesh through irrigation and power.

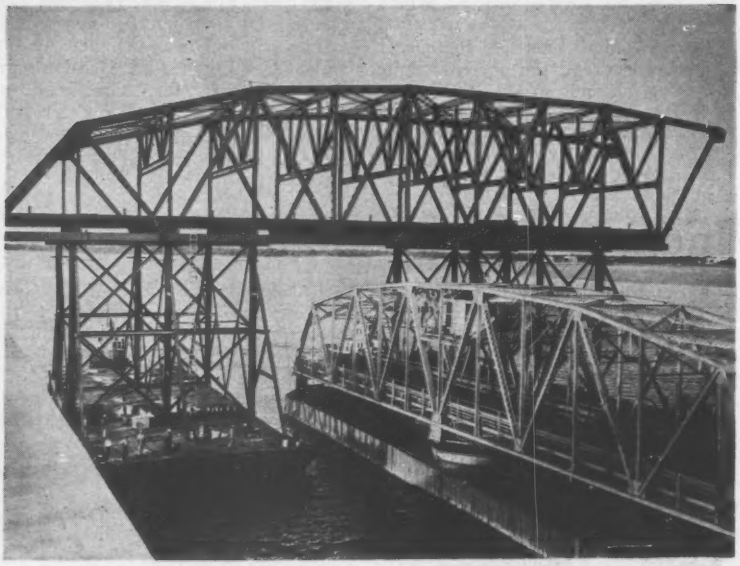
The power will permit expansion of the cottage industries and attract major industries to the region.

The dam, still under construction, is a gravity-section structure 296 ft high and 3,254 ft long located on the Rihand River. Five 50,000-kw generators will be installed in the powerhouse. Power will be transmitted over 132-kw lines.

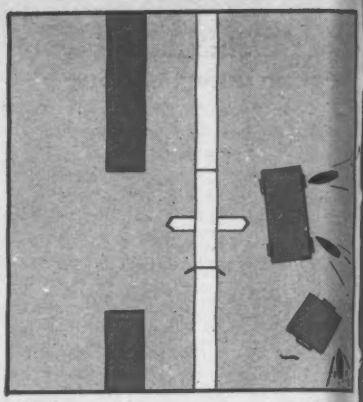
Market studies indicate that India, which now imports all its aluminum, has a rapidly growing demand for the metal. The new plants will help meet that demand while at the same time reducing the country's foreign exchange requirements.

Birla Industries is one of the largest private industrial organizations in India and leader in that country's continuing industrial revolution.

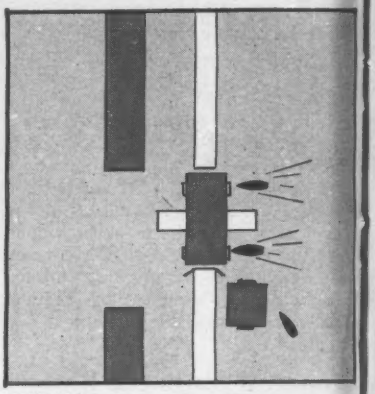
Before the truss for new bridge could be assembled and placed . . .



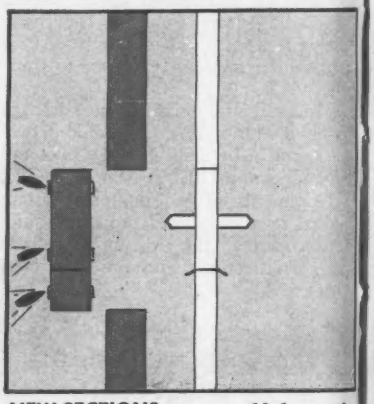
. . . part of it had to be slipped over the open swing span of old bridge.



TUGS wait for swing span on old bridge to open before . . .



PUSHING barge-mounted section for new bridge through, astraddle the swing span.



NEW SECTIONS are assembled on the other side, then pushed into place.

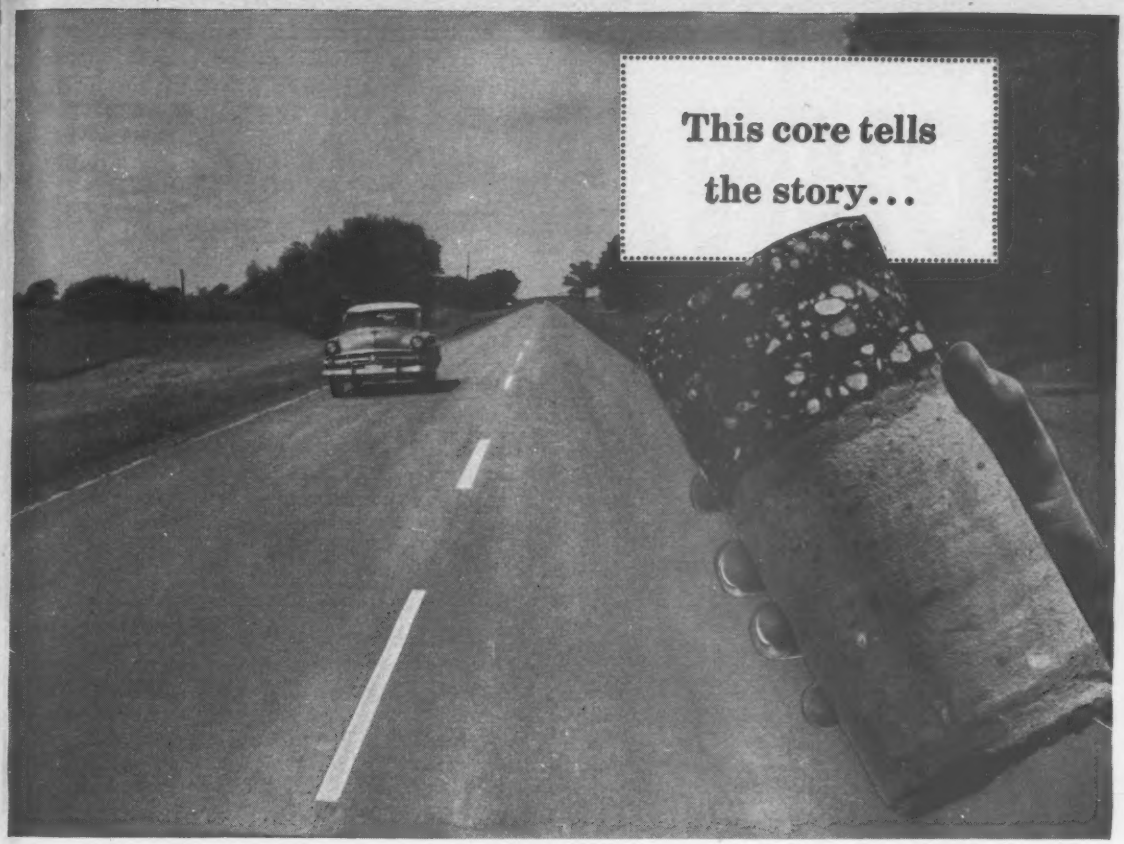
Leapfrogging One Bridge Over Another

Erecting the main span of a Florida bridge, contractors resorted to unusual techniques. Among them: leapfrogging one span over another and connecting two truss sections while they were floating on separate barges.

The operation took place early this month during construction of the $5-million Hathaway Bridge across St. Andrews Bay at Panama City, Fla. The entire bridge is 3,600 ft long and 67 ft wide. It is designed to carry four lanes of vehicular traffic.

Its channel span is a simple truss designed so that it can be used later as part of a vertical lift bridge if up-bay development of a deep-water port should require more than 52-ft water clearance. This truss is the unit that had to play leap frog. It weighs 850

(Continued on p. 32)



Compressive strength was 1,697 psi in 1958 on Minnesota's Trunk Highway No. 1. In 1941, 28-day strength was 580 psi. Adverse conditions include temperature range from −45° to +107° and frequent spring flooding.

Strength increased 192% in 17 years on this Marshall County, Minn. highway

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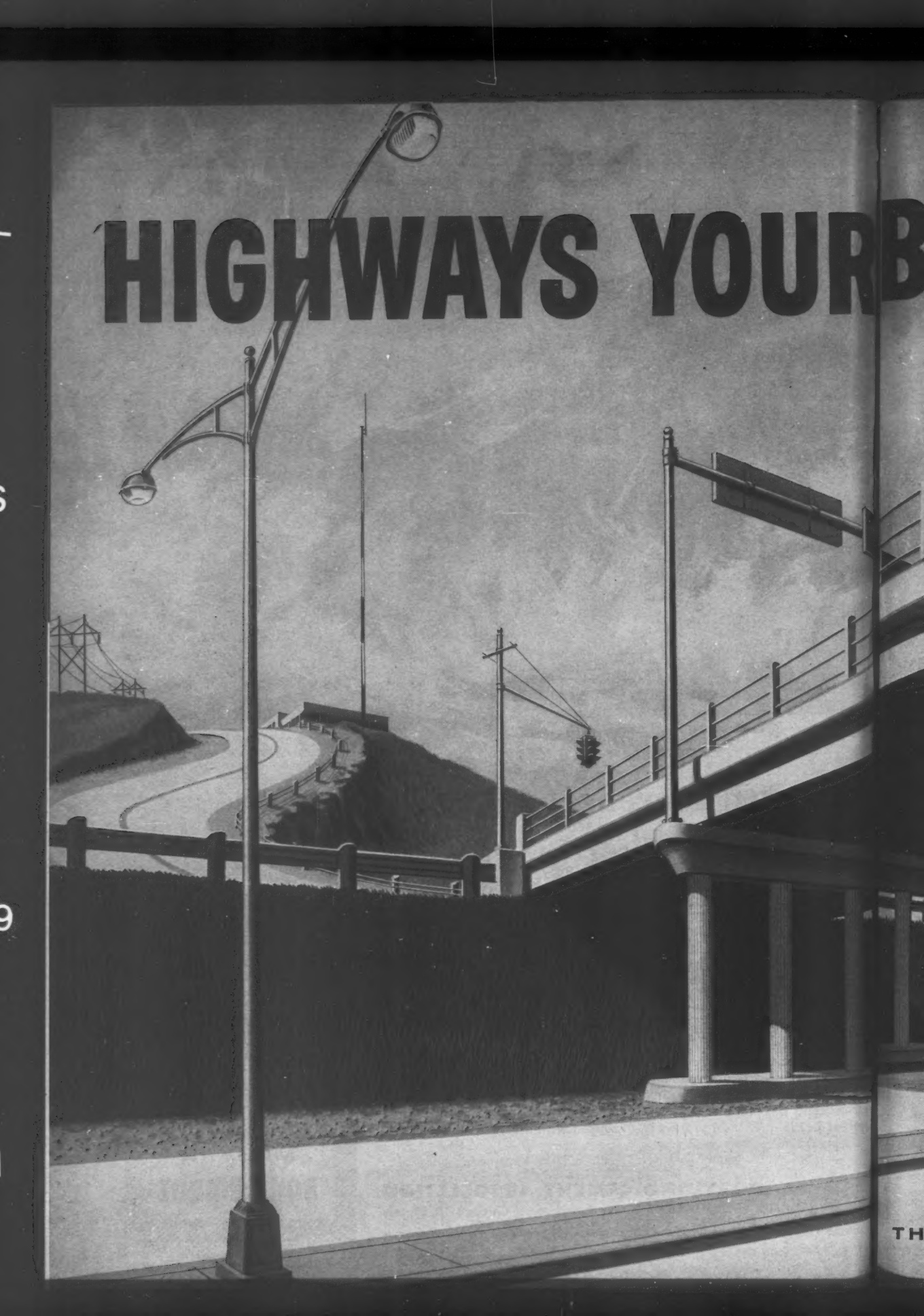
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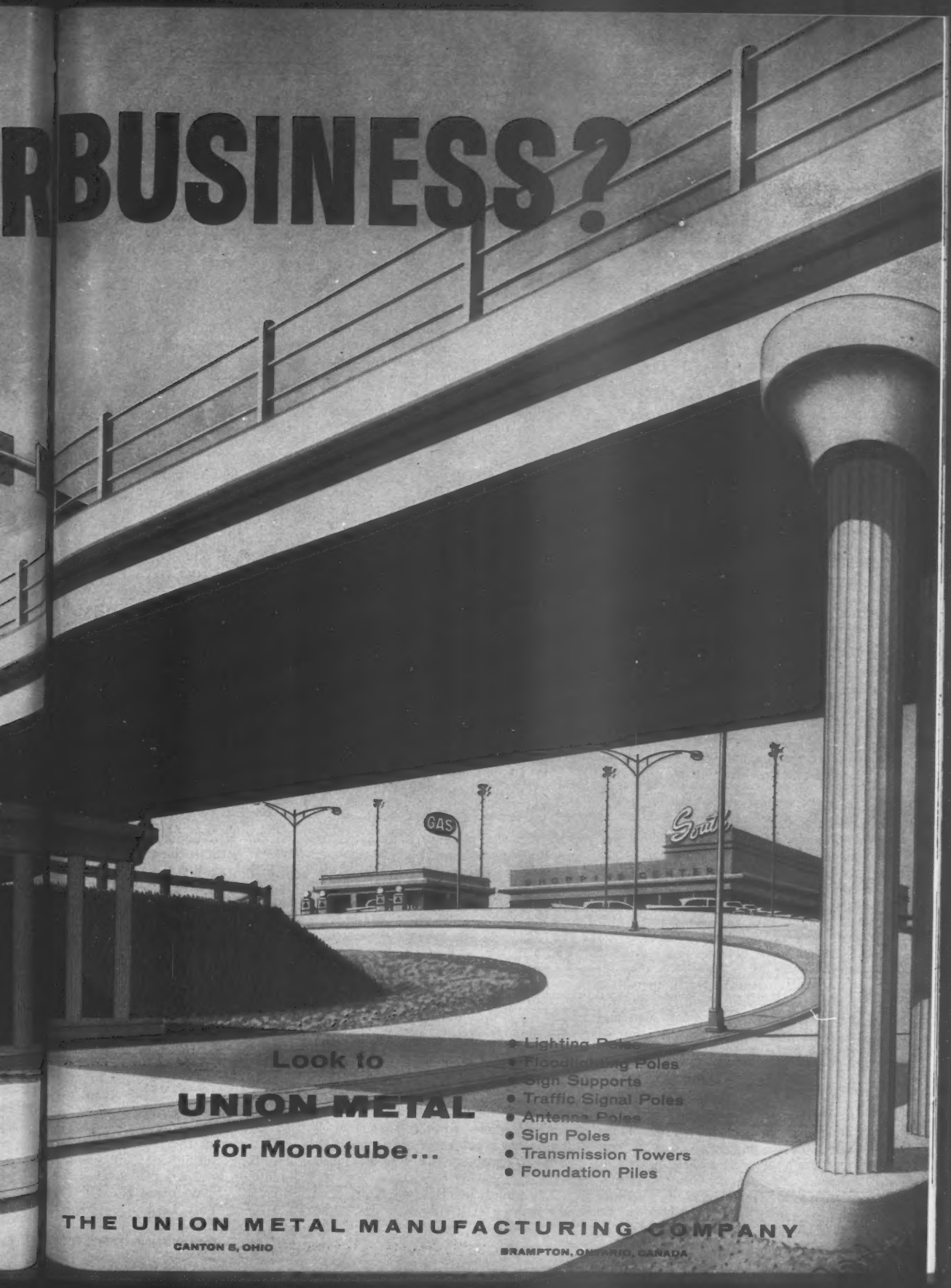
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tons and is 327½ ft long, 48 ft high at the center.

The bridge is being constructed less than 100 ft away from an obsolete—but still used—low-level crossing with a 202-ft swing span. The Corps of Engineers gave the contractors the right to close the swing span to water traffic for 48 hours during the erection of the new truss. The Florida State Road Department asked that disruption of vehicular traffic be kept to a minimum.

Actually, the old bridge was closed to water traffic for only 10 hours; to automobiles for only 27 minutes. Here's how it was done:

Fabricated steel was shipped by rail from the Bessemer, Ala., yard of the Nashville Bridge Co. to a shipyard down-bay from the bridge. Here, on falsework supported by three barges, the truss was assembled in two sections. Two barges carried 9½ panels of the unit. The remaining 2½ panels were assembled on the third barge.

This two-piece construction was necessary because of the difference in length between the new and old spans —327 ft as opposed to 202. It wasn't possible to balance the entire truss on two barges, clear the fenders of the old bridge and still align the truss with its bearings.

The two barges carrying the main truss section were floated up-bay first. The old swing span was opened, and with a barge going through on either side of the center pier, the new truss was pushed upstream over the main span of the old bridge. The clearance between upper chord of the one span and the lower chord of the other was only 20 in.

Once clear of both the new and old structures, the truss section floated slightly inshore and tied up to the new crossing. The smaller section of the truss followed.

Connection of the two sections was made easy by water-ballasting the barges for alignment of the bolt holes. The completed truss was then towed away from the bridge and floated back into its position over the channel. Water ballasting of the three barges settled the truss on its bearings and cleared it of the falsework.

When the new bridge is opened to traffic, the old bridge will be only partially demolished—the swing span and a 180-ft truss section on either side of it will be removed. The remaining 3,000 ft will be left in place to serve as a public fishing pier.

The Hathaway Bridge was designed by the Florida State Road Department under the direction of W. E. Dean, state bridge engineer. General contractor on the project is the Scott Co., Opelika, Ala. Kansas City Bridge Co., Kansas City, Mo., erected the span with W. B. Smiley Co., Lake Charles, La.

Around the World . . .

• **Bridge closure**—A 10-ton girder closed the gap on the new 2,058-ft Summit Bridge over the Chesapeake & Delaware Canal at Summit, Del. The $7-million crossing replaces an old drawbridge.

• **Arm bender**—The Town Board of West Seneca, N. Y., has passed an ordinance giving the town power to order repairs of unsafe structures. The town may appoint inspectors to check unsafe or collapsed buildings and if the owner fails to make repairs recommended, the town may order a contractor to do the work and then bill the owner for the cost.

• **Policy affirmed**—The American Society of Civil Engineers will publish in September a restatement of its policy on unity in the engineering profession. The ASCE philosophy: Unity means cooperative effort on matters of common concern, professional as well as technical; Engineers Joint Council exists as the framework for such effort.

• **Great Lakes Diversion**—Despite strong opposition from six Great Lakes states and Canada, the Senate Public Works Committee has approved a bill that would permit Chicago to take more water from Lake Michigan. The committee amended the House version to make the city liable for damages to shipping or power projects.

• **Rebuilding LaGuardia**—The Port of New York Authority has expanded an improvement program for LaGuardia Airport from $32 million to $56 million. Begun two years ago, the program now includes a passenger terminal at $23.2 million, two-level approach roadways and parking areas, and an entirely new, $11.8-million runway.

• **Amity on the Indus?**—India and Pakistan might sign an agreement on the Indus River dispute as early as January. World Bank officials and representatives of the two countries have been working out a settlement.

College Offers Overseas Training

The "Ugly American"—the overseas misfit—is going to be beautified. American University in Washington, D. C., and the Business Council for International Understanding will start a training program for American business executives who will work overseas.

The program is aimed at sending overseas men better prepared to succeed in their assignments and to build good will for the U. S. abroad. To accomplish this, the program is intended to give the overseas-bound executive:

• Understanding of the people of his host country—their needs, aspirations and point of view.

• Ability to explain and defend the U. S. economy and government, and other aspects of American life.

• A start toward speaking the language of the host country.

• Some concept of the business, social and domestic situations he will encounter.

• Orientation for his wife to help in representing the U. S. abroad.

Any American business executive can enroll in the course. Fee is $500. The program has the active cooperation of the U. S. State Department and the U. S. Information Agency. The course runs for six weeks. It will be given six times during the next year. The first one starts Sept. 14.

Pumped Storage Hydro Job Bid

Appalachian Power Co. is ready to build its $45-million Smith Mountain Dam project on the Roanoke River as soon as the Federal Power Commission acts on the license application. The firm took bids last week on the two-dam pumped-storage project. Bid prices have not been disclosed.

Specifications covered both rockfill and concrete arch construction for both dams. No decision on type has been made.

The project involves two dams about 17 miles apart downstream from Roanoke, Va. Generating capacity will be 285,000 kilowatts at the upstream powerhouse, 35,000 kw at the downstream plant.

Reversible turbines at the downstream plant will pump water into a storage reservoir during low-demand hours for use in power generation during high-demand periods.

Designer of the project is American Electric Power Service Corp. Both the designing firm and the owner are subsidiaries of American Electric Power Co., New York City.

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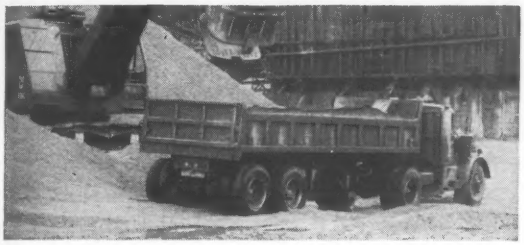

Hoist-Type Dumps—Wide range of designs—steel units (shown above) or frameless aluminum units (shown below) with up to 3,500 weight savings—single or tandem axle suspensions—single or twin front-mounted or under-mounted telescopic hoists—sand and gravel units or rugged rock bodies.

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Making Quick Work of a Comple

The permanent home of the Tokyo Trade Fair is a product of fast construction and complicated design work.

The main, domed hall of the fair grounds, spanning 400 ft, was the center of this activity because:

- The 2,500 steel triangular panels of its skewed, trussed frame were all of different lengths with different connections.
- Crowded schedules allowed less than 180 working days for erection.

The building's shape is extraordinary, too. Place a shallow bowl upside down and slice a section off one side, tip up the opposite side a bit and cut a hole through what is now the top center—that's roughly the shape of the main hall.

Architect Masachika Murata tipped the dome over its entrance for two reasons: to let light in around the entire back side, and to give the whole structure a mobile effect.

And he chose a dome to eliminate interior supporting columns.

Rotating catwalk inside dome provides access to ceiling lights.

While crews were building foundations for the dome, and working at it on a 24-hour basis, elements for the steel frame were being turned out at a factory as fast as designers could check on the size and dimensions of each piece.

The framing consists of 2,500 triangles of different length and size, formed by intersection of trussed ribs. But all trusses have a constant depth of 3 ft 4 in. Reason for the changing sizes is that the designer divided the semi-circumference into six sections, and each, in turn, was divided by 20 concentric circles.

With this dome layout, Prof. Yoshikatsu Tsuboi, of Tokyo University, the structural engineer, had each triangle calculated by spherical trigonometry using an electronic computor. With 2,500 separate problems, and as many connections, it seemed the simplest system, considering the time available.

The dome rests on a 400-ft-dia reinforced concrete foundation ring, supported on 650 concrete piles that vary from 23 to 40 ft long. All are driven at a batter of 1 on 10, angling out from the foundation ring to provide a reaction to the thrust of the dome and to give support in the site's land-fill.

The entrance arch at the front of the hall is a slanted curve with a 696-ft radius. The steel box frame of the arch rests on heavy concrete abutments

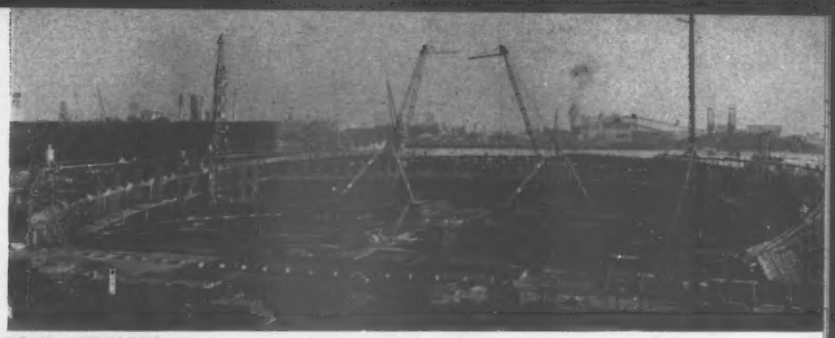
le Dome

reaching 40 ft below ground level. Tie rods between the abutments connect the arch ends.

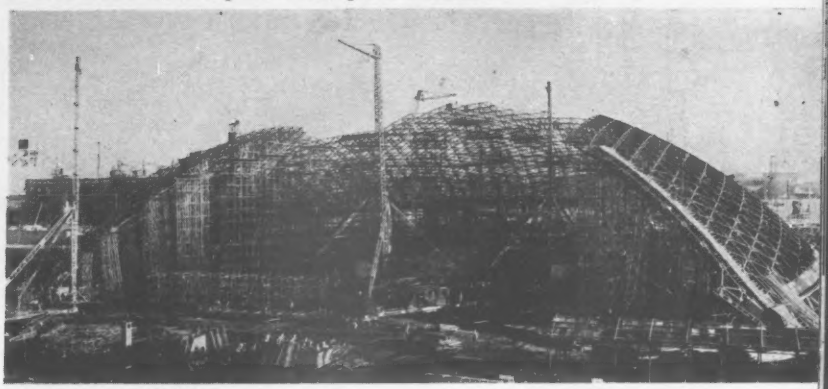
Dome erection began at the rear and worked forward toward the arch entrance. Taisei Construction and Engineering Co., the builders, set up four stiffleg derricks in a semicircle within the perimeter of the dome to handle erection. As the dome was built up, on tabular steel scaffolding supports, the derricks were rolled out toward the arch. To complete the top central portion of the structure, Taisei set up a steel scaffold tower rising 180 ft high through the center of the dome. This tower, equipped with side-mounted jib booms, remained in place until the last of the dome frame was erected. It ended up projecting through the 50-ft-dia skylight at the top of the dome.

Workers built up the roof over the 950-ton frame in this manner: First came 3x6-ft sections of wood-chip concrete plank as an acoustic baffle. Over this went wire mesh and pneumatically applied concrete, 1¾ in. deep. A three-ply build-up roof covered with aluminum paint completed the job.

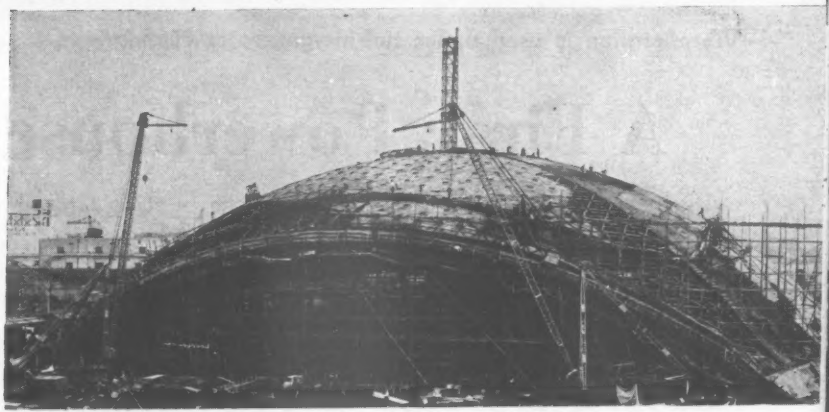
The 100,000 sq-ft dome cost $1 million. The Tokyo Trade fair is an annual event that up to this year was quartered in $1 million worth of temporary buildings (ENR May 7, p. 83). The buildings were erected and disassembled each year.



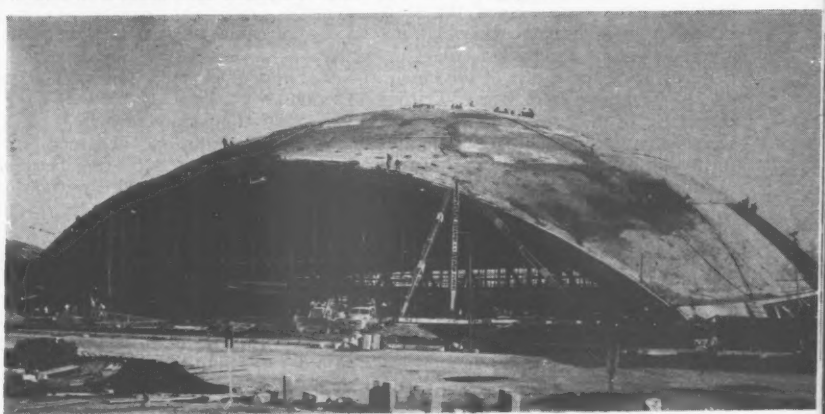
FOUR DERRICKS, starting at the rear, sped steel erection.



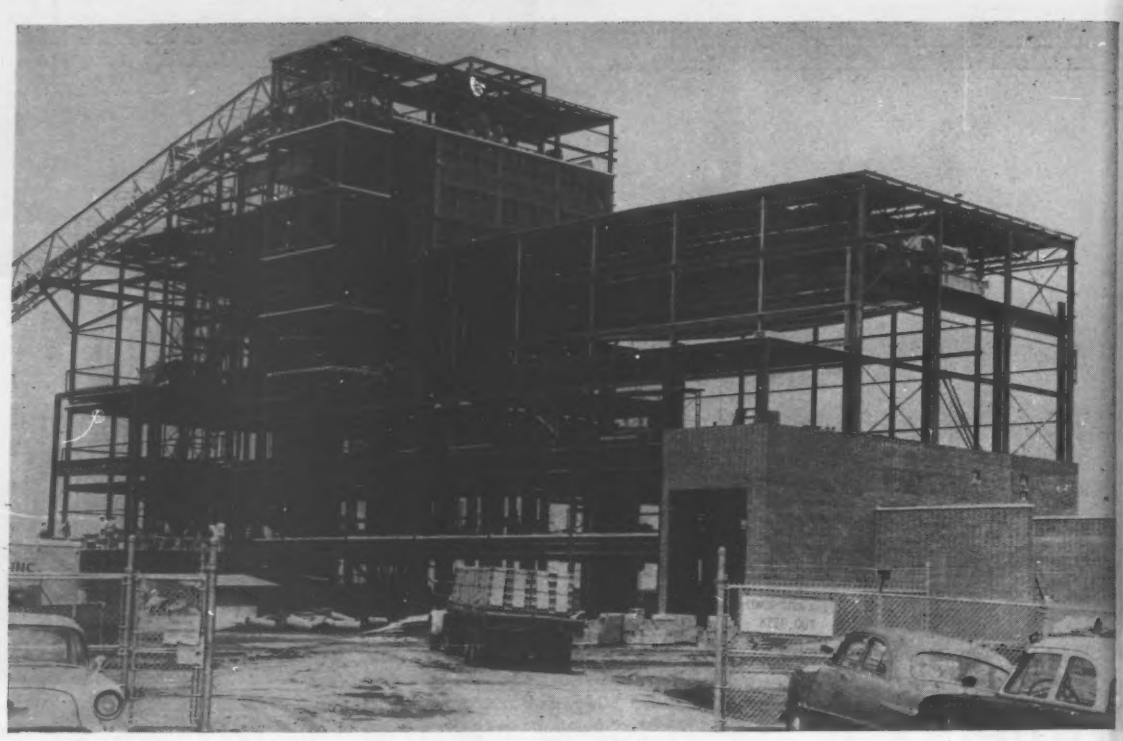
FOREST OF SCAFFOLDS carry the frame as crews work toward dome entrance.



ROOF IS BEGUN even before last section of frame is completed.



CONCRETE IS SPRAYED over acoustical board, with built-up roofing on top.



Vibroflotation is used under turbine-generator foundations.

A First: Powerhouse Stands Firm On

The site of a new 33,000-kw power plant near Spencer, Iowa, was chosen primarily for the excellent aquifer underlying it in a glacial deposit of sand and gravel.

But the water bearing soil presented big problems in foundation design, despite its attractiveness as a source of water.

Even when very low soil pressures are used in design, footings in sand are likely to settle excessively if the sand is subject to high-frequency vibrations induced by rotating machinery.

Recognizing the threat of settlement due to vibrations from heavy rotating equipment of the power station, the designers use the Vibroflotation method to pre-settle the sand subsoil—probably making first use of this method of soil compaction in the U.S. for a power plant foundation.

The powerplant layout called for the ground floor to be about 1 ft above grade and footings to be 4 ft below grade. Column loads ranged from 50 to 1,000 kips, exclusive of concrete footings and ground floor slab. The turbine-generator with its foundation weighed over 2,500 kips. And beside the turbine-generator there were coal pulverizers, pumps and fans—the usual rotating machinery of a power plant.

Three foundation solutions were considered:

1. Long piles or piers extending into clay.
2. Short piles used for sand compaction.
3. Sand compaction by vibration.

The first solution was discarded both because of its greater cost and because it was deemed inadvisable to transfer large concentrated loads directly to the underlying clay. Also, the use of long piles under column footings would have required additional piles to support the ground floor slab, or a heavy concrete beam system would be needed to transfer floor loads to the main pile clusters in order to avoid differential settlement of the floor slab.

The second solution's short piles were more expensive than sand vibration and would not provide its uniformity of compaction, so sand vibration was chosen.

It appeared desirable to use spread footings and to compact the sand by vibration to form a thick dense layer that would transmit column loads as uniform loading over a larger area of the clay substrata. Sand vibration had the additional advantage over compaction piles of being suitable for the compaction of the fill material between the elevation of the bottom of the spread footings and the underside of the ground floor slab.

• **The chosen method**—It was decided to compact, or presettle, the sand subsoil by the proprietary method, Vibroflotation. Vibroflotation was developed for compaction of granular soils in Germany shortly before World War II and introduced to this country in the late 1940's. (See "Sand Needn't Be Treacherous," ENR July 2, 1953, p. 35).

The method uses a vibrator consisting of a cylindrical steel casting tipped with water jets and containing an electric-motor-driven eccentric rotating weight (200 lb), which provides the

By Donald C. Petersen and Dimitri Nesterenko, of Stanley Engineering Co., Muscatine, Iowa. Mr. Petersen was the structural engineer in charge of the work. Mr. Nesterenko is the firm's principal structural engineer and was an advisor on this project.

"Vibroflot" enters the soil . . .

to do shaking, jetting job.

Sand is added as soil settles.

irm On Vibrated Soil

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vibration. The 4,000-lb Vibroflot is sunk to the desired depth of consolidation by vibration coupled with an upward injection of water from the bottom of the vibrator. When it reaches a predetermined depth, the water feed is changed to the top and directed downward. Sand is gradually dumped into the crater to replace soil volume lost by compaction. As consolidation takes place the vibrator is withdrawn step by step, resulting in a cylindrical compacted column 8 to 10 ft in diameter.

The contract specifications written for this project required compaction to a minimum relative density of 70% for the entire main building area and for the subsoil under various outside structures, including an elevated water storage tank and several coal handling structures.

Although some money could have been saved in the main building area by compacting only under column footings, it was considered an unwise solution. The savings would have been small compared to the risk of having ground-floor areas subject to differential settlement.

An allowable bearing pressure of 6,000 psf was used in the design of the building footings. In some cases, where the ratio of live-load to dead-load was unusually high, the allowable bearing pressure of 6,000 psf for total load was exceeded slightly in an effort to make the dead-load bearing pressure fairly uniform throughout the building.

The area under the turbine-generator foundation was compacted to a minimum relative density of 85% since this is the area subject both to differential settlement and vibration. The machine has a total weight of 327,000 lb and rotates at 3,600 rpm.

• **How it worked**—First, the 3 ft of topsoil was stripped off, to be replaced with clean granular fill. Then the compaction was started and performed in two stages.

The first stage extended from slightly above the bottoms of the footings to a depth of 17 ft below the footings. There were 680 penetrations required; 599 in the main building area; 26 under the water tower; and 55 under various coal and ash handling structures. Triangular spacing of 7 ft 6 in. by 6 ft 6 in. between penetrations was used to achieve 70% minimum relative density; a triangular spacing of 6 ft 6 in. by 5 ft 6 in. was used for the 85% minimum relative density.

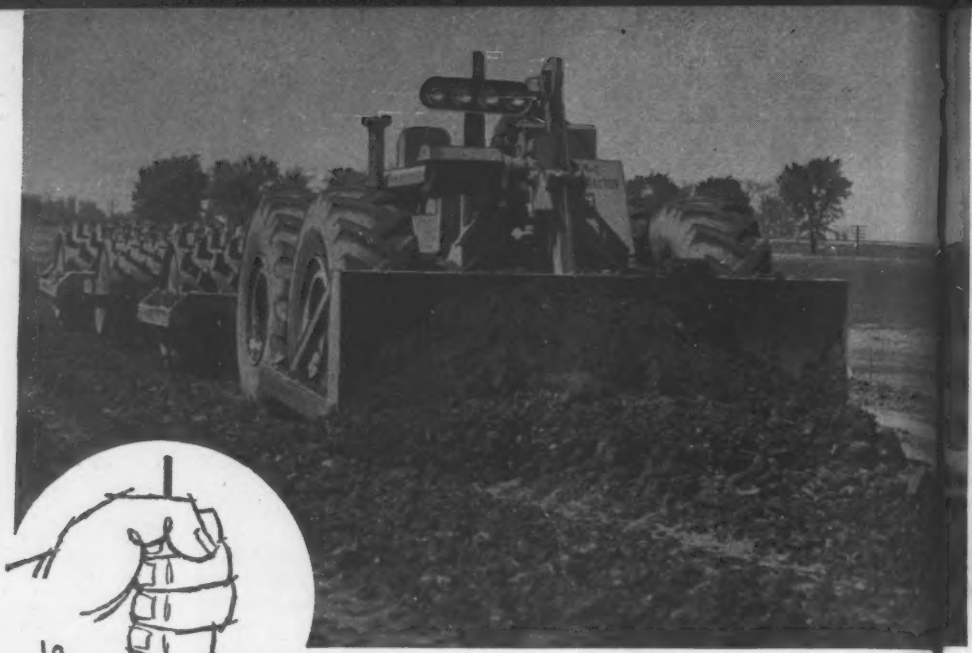
About 2½ cu yd of sand fill was required for each penetration to replace the volume lost by compaction. Water was used at the rate of 60 gpm during the compaction operation. Total water consumption averaged 2,000 gal per hour for each Vibroflot unit.

Difficulties were experienced in achieving the specified depth of penetration in some areas because of a layer of coarse gravel. It was loose enough to permit rapid diffusion of water without its very coarse particles being dislodged.

The cycle of operations normally required 10 to 20 minutes for each penetration. Of this time, about five minutes were used for actual compaction. It was observed that most of the consolidation took place during the first minute of operation, after the water feed was directed downward.

The second stage of compaction was performed after column footings were in place, to consolidate the 5 ft of granular fill between the bottom of the footings and the underside of the ground floor slab. A minimum relative density of 60% was specified for this second stage of compaction.

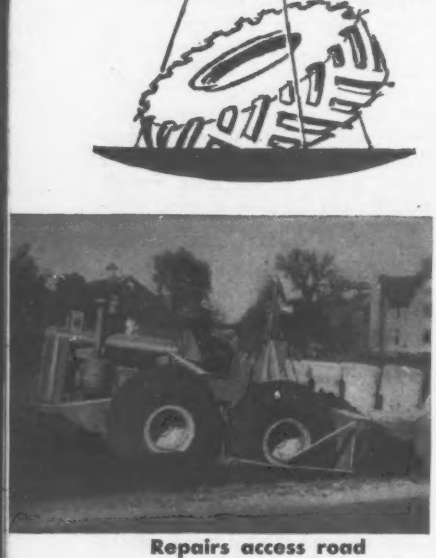
Field testing of relative density was somewhat complicated on this site by the fact that the sandy subsoil was



BALANCE your tractor fleet for extra profit...

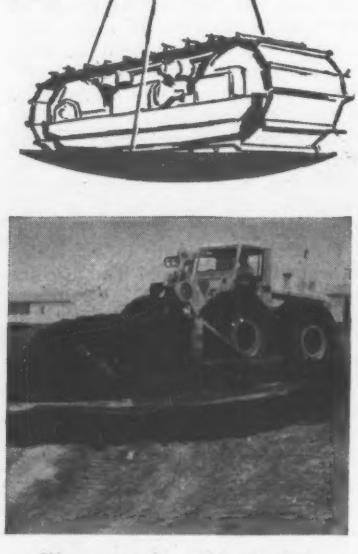
When you plan dirtmoving contracts, you are usually faced with a wide variety of tractor assignments.

The question is: What kind of tractor — crawler-mounted or rubber-tired — will pay-off best in the work you're handling?



Repairs access road to isolated farm

Farmer's access road 5 miles down the pike is washed out. He can't get his pick-up out to the road, can't move his produce to market. Your Tournatractor is on the job in 20 minutes... repairs road in 20 minutes... is back on its regular job in another 20 minutes. You've saved money, made friends.



Hires out for plus profits

A property owner near your job wants land leveled for building site, or drainage. You "borrow" Tournatractor from production fleet ... send it over highways, through city streets to the work site. Whole job takes only a few hours. Tournatractor earns $75 or so extra pay ... without delaying the main job.

Balances production — cuts moving time

When your production fleet moves, self-propelled scrapers roll over highways to the new job. Tournatractor rolls with 'em. Scrapers can begin work on arrival, if a Tournatractor is used to push-load. (Crawler-pushers are usually latecomers since they must be loaded on flat-beds, hauled to job site, and ramp-unloaded.) When short hauls bunch-up your scrapers in the cut, again drive in Tournatractor. This tractor will quickly balance your pusher operation, until longer hauls get your production fleet back into efficient spacing.

Clears right-of-way for production earthmovers

While your heavy-duty crawlers grub out stumps or break up shale, there's plenty of rough work that a speedy tractor-on-rubber can handle . . . scattered work that will get your production haulers working sooner. Use a Tournatractor to pile logs, stumps, and brush, build and maintain haul roads, doze boulders, clear turn-around areas, connect access roads, cut drainage ditches to keep borrow pits and haul roads dry.

Big, 2-ft wide tires aid compaction

Material on fill is piling up fast. It needs continuous compaction or it will delay scraper cycles. Tournatractor levels high spots with its dozer blade, at the same time it pulls a 35-ton, 6-drum sheepsfoot roller. Tournatractor's 2' wide tires, carrying 20 tons of weight, combine prepacking with heavy 30 to 50-ton follow-up for most effective compaction.

Quickly reconditions mucky haul roads

Your heavily-loaded scrapers cut deep ruts into wet haul roads . . . slow production cycles. Tournatractor, called from an assignment a mile away, can be regrading damaged haul road in 5 minutes. With quick forward and reverse passes, Tournatractor dozes in fill, levels surface, cuts a trench to improve drainage . . . puts production scrapers back on schedule. In fact, it's profitable on most jobs to have this quickly available unit patrol your heavily used haul roads several times a day.

For heavy, short-haul work? For scattered work?

For most heavy, short-haul work . . . for dozing in rock-filled earth . . . and for "stay put" work in limited areas . . . slow-moving crawler-tractors fill the bill, because they have more lugging power at slow speeds.

For work where travel range is important . . . for leveling scattered fill . . . towing "part-time" scrapers . . . cleaning up . . . maintaining haul and access roads . . . push-loading . . . finish-grading . . . and doing dozens of "chores" scattered over a wide work area . . . your best bet is today's improved 218-hp, 17-mph, rubber-tired LeTourneau-Westinghouse Tournatractor®.

Crawlers to "lug" . . . tires to "run"

To handle your work at lowest cost you'll want to team L-W Tournatractors and crawlers in proper balance . . . using crawlers to "lug" and Tournatractors to "run."

Of course, as every project varies, you can't work out an exact mathematical formula between crawlers and rubber tires. Start with rubber-tired tractors where you obviously need most of their speed and maneuverability. Then, extend your rubber-tired percentage as you find it profitable for your operation. Keep in mind, as you plan, the growing importance of mobility in today's bigger, large-area dirtmoving jobs.

Some contractors say a tractor fleet should be evenly balanced . . . half "track," half "rubber." Others find that one Tournatractor does the work of two crawlers on their particular operations, and plan accordingly.

We've pictured here, some typical circumstances where a work-and-run tractor-on-rubber helping on your contracts, will bring you maximum profit.

Cuts emergency drainage ditch

Rain forecast for tonight . . . could easily flood poorly-drained cut in spongy clay . . . could side-line your production fleet for days. In 10 minutes, speedy Tournatractor drives 2 miles . . . soon digs drainage ditch, then smooths cut and haul roads to eliminate water pockets. No production delay today! And, come heavy rains tonight, the dirt will still roll on schedule tomorrow!

CT-1517-DC-2

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

FOR QUICK AND POSITIVE FORM ALIGNMENT

New! **SUPERIOR**

Adjusta-Brace

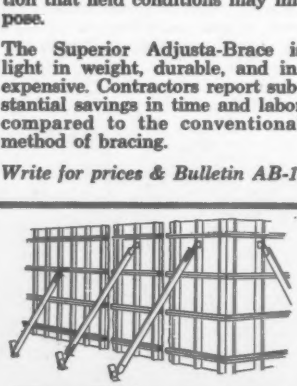
Permits maximum adjustment in ANY direction at ANY angle.
THIS UNIT may be nailed in any position onto stud or waler, as desired.
ADJUSTING UNIT for making preliminary and final form adjustments.

Providing a swivel action for quick positioning and adjustment, the Superior Adjusta-Brace consists of two units, connected by a 2 x 4, 2 x 6 or a 1" i.d. pipe. Either unit may be attached to the wall form, or to the stake, but it is usually more convenient to use the Adjusting Unit at the stake.

The Adjusting Unit has a patented double-wing nut, working on a 1" diameter rod, with an adjustment of 12". The design of this bracket and the method of attachment are such that it works as a universal joint to take any required position. The companion non-adjusting unit is also designed to take any position that field conditions may impose.

The Superior Adjusta-Brace is light in weight, durable, and inexpensive. Contractors report substantial savings in time and labor compared to the conventional method of bracing.

Write for prices & Bulletin AB-1.



VARIOUS METHODS OF USING SUPERIOR ADJUSTA-BRACE
Nailing brackets may be fastened to stud or wale, and stake.

SUPERIOR
CONCRETE ACCESSORIES, INC.
9301 King St., Franklin Park, Ill.
New York Office
39-01 Main St. Flushing 54, N. Y.
Houston Office
4101 San Jacinto, Houston 4, Tex.
West Coast Plant
2100 Williams St., San Leandro, Calif.

. . . Vibrated soil

not homogeneous, but existed in layers of varying gradations.

Nearby deep excavations indicated many very distinct strata with remarkable differences in density and gradations, ranging from a fine uniform sand to a coarse sand and gravel. Since each different gradation of soil has a different minimum and maximum density, it was impossible to determine relative density by analysis of a single relative density curve.

The soils were classified into three predominant categories, and a relative density curve was established for each category. It was necessary to classify visually each sample of soil taken for relative density tests into one of the three established categories. Because of the large variations in soils, it was also necessary to interpolate from the established relative density curves in the case of some in-between soils.

• **Soil not easily tested**—Final analysis of all test results indicated consolidation of the subsoil from an original relative density of 40 to 60% to an average minimum relative density of 85 to 90% in the area where 70% minimum relative density was specified.

As an additional benefit of the increased density, the general contractor in building the substructure was able to maintain vertical walls of excavation for those footings located below the surface of the compacted soil and to construct those footings without side forms.

The total cost of the soil consolidation, including both first and second stages of compaction, hauling and placing of fill sand, and the cost of field testing, was $50,040. The unit prices quoted for adjustment of quantities of compaction were 6.6 cents per cu ft for 70% minimum relative density and 9.3 cents per cu ft for 85% minimum relative density. The first stage of compaction was completed in three weeks time; the second stage of compaction required two additional weeks at a later date.

The new 33,000 kw power plant, being built for the Corn Belt Power Cooperative of Humboldt, Iowa, was designed by Stanley Engineering Co., Muscatine, Iowa. Solution of foundation problems was the responsibility of the authors. D. C. Petersen prepared the specifications on the compaction work.

The general contractor for the building substructure was Jens Olsen & Sons Construction Co., Waterloo, Iowa. Vibroflotation Foundation Co., Pittsburgh, handling the compaction subcontract. E. D'Appolonia Associates were in charge of field testing.

Only ONE Working Part...

THE COMBINATION CLAMP

Aligns and Locks Form, Receives Tie Rod, Holds Liner, and Provides Shelf.

SIMPLICITY — any crew with minimum experience will be able to make fast progress.

ONE WORKING PART—does 4 separate jobs.

ONLY ONE TOOL NEEDED—a hammer.

SUPERIOR All-Ply Panels are used in all types of construction—for forming ordinary residential foundations to intricate high walls.

The great strength and rigidity of All-Ply Panel Forms are provided by exterior grade 1⅛" plywood, backed at strategic areas with ½" plywood. Forms weigh less than 5 lbs. per sq. ft. and are easily handled by one man. A hammer is the *only* tool required for erection and stripping. The absence of frames permit easy stacking and transporting in minimum space. Long life and many re-uses are assured.

Write For New 8 Page Bulletin AP-59

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Concrete Accessories, Inc.
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How to handle more small dirtmoving jobs . . . at bigger profit

• Site improvement

Want to grade a subdivision? . . . level a parking lot? . . . dig a big basement? . . . fill a swamp? . . . grade a side road? On small and medium-size earthmoving jobs, maneuverable, roadable D Tournapull® with 9-yd. scraper will move your dirt at lowest-net-cost-per-yard.

Maneuvers fast in close quarters

This LeTourneau-Westinghouse D Tournapull works easily and fast between houses, close to foundations, between trees. In tight quarters, it can cut and fill closer, grade more accurately than crawler-drawn or bigger self-propelled earthmovers. With 90° geared electric-steer on kingpin, D Tournapull turns sharply . . . makes continuous U-turns in less than 25 feet.

In soft going, exclusive L-W power-transfer differential keeps pulling power on the drive-wheel with better traction . . . keeps Tournapull working where other haulers bog down. Big tires roll easily over rough, rutted, or rocky terrain . . . spread weight for fast turns and travel over soft ground . . . will not damage curbs or walks.

Big output for its size

This Tournapull self-loads . . . may be push-loaded by tractor or another "D", to heap capacity payloads fast. Unit accelerates quickly . . . normally hauls at 11.9 mph to 20.7 mph . . . spreads on-the-run in lifts accurate to ½ inch. On return and travel, "D" speeds up to 29.5 mph.

143 hp "D" hauls big yardage because it works fast . . . maneuvers fast . . . earns quick money as a one-man dirtmover on a wide variety of small yardage assignments. This 9-yd. Tournapull can also fill-in with your bigger scrapers, for profitable heavy production.

Roadable without permit

One job completed, you can quickly move 29.5 mph "D" to another project. 10 miles is less than half an hour away. This 9-yd. rubber-tired scraper is only 8 feet wide, weighs less than 9 tons per axle . . . is roadable without permit in all 48 states. It handles easily in city and suburban areas . . . travels safely in traffic. It can move 3 or 4 hundred yards of dirt in the extra time it would take a crawler and scraper to move in.

And whenever you sell your "D", you'll find you've a ready market, high trade-in . . . the lowest ownership cost on your records.

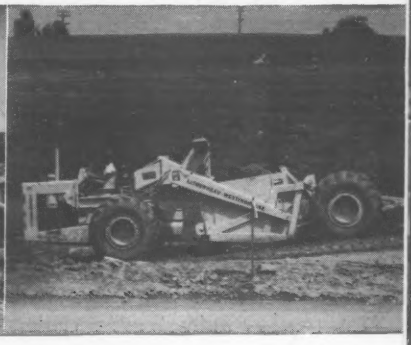
Call or write for an early demonstration. No obligation.

DP-1560-DC-1

• Road and street work

• Subdivision grading

• Building excavations



LW

LETOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

Wahluke Siphon Irrigates 100,00A

Three-mile-long siphon is located near Hanford, Wash.

Nearing completion in Washington is a 15½-ft-dia, three-mile-long siphon that will furnish irrigation water for some 100,000 acres near the Atomic Energy Commission's Hanford Plant. The work is part of the Bureau of Reclamation's Columbia Basin Irrigation Project—the million-acre project that centers around Grand Coulee Dam.

The new structure—the Wahluke siphon—will provide water for Wahluke slope, just across the Columbia River from the AEC installation.

When the Hanford plant went into operation during World War II, nearly 300,000 acres of land were restricted. Of this, 165,000 acres are irrigable.

In 1953 AEC released 87,000 acres, permitting start of work in this area. And early this year the commission released an additional 105,500 acres.

Still restricted are an 88,000-acre control zone—of which 47,000 acres are irrigable. This land will remain restricted as long as the Hanford reactors are in operation.

Wahluke siphon is part of a $19-million Wahluke slope construction program that started in 1956. The $6.2-million siphon contract is by far the largest single job in the program. It's

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held by E-W Construction Co. of Eugene, Ore.

The siphon includes 2,500 ft of steel pipe from ⅜ to 1⅛ in. thick. This pipe is in a lake-crossing section at the low point of the line and is supported on concrete piers 120 ft apart.

An additional 6,000 ft of the siphon has ⅜-in.-thick steel liner plate surrounded by a 15-in. thickness of concrete. The rest is unlined reinforced concrete of similar thickness.

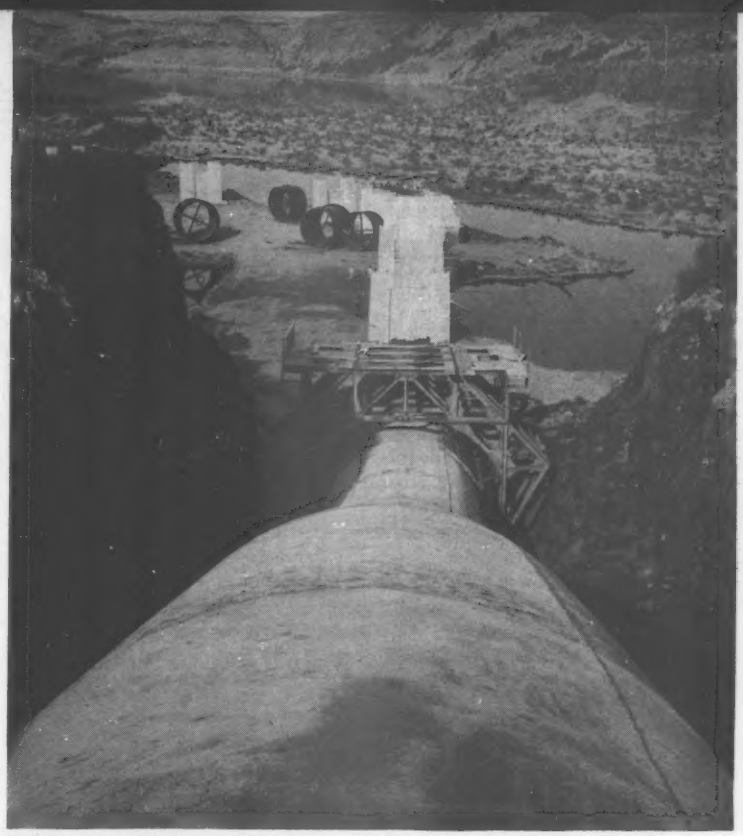
After reinforcing steel was placed on the monolithic section, concrete crews were able to cast the barrel in 24-ft sections at the rate of two a day. Crews used two sections of steel movable forms, carried by rail mounted gantries. The retractable, hinged sideforms were moved in and out by jacks. Inside forms were also rail mounted.

On the steel-lined sections, the two 24-ft forms were combined to make a 48 ft form. No inside form was necessary for the lined sections.

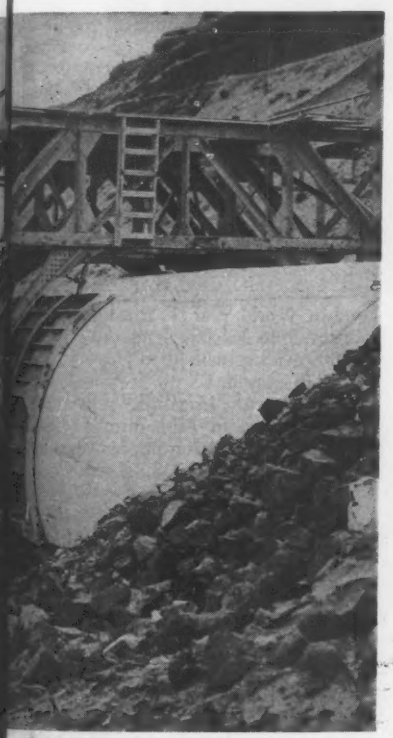
The job required 365,000 cu yd of excavation, including 70,000 cu yd of rock.

After grading, a gravel base up to 6 in. thick was placed in some areas.

Steel liner sections and the steel



Piers, on 120-ft spacing, carry steel tube siphon over lake.



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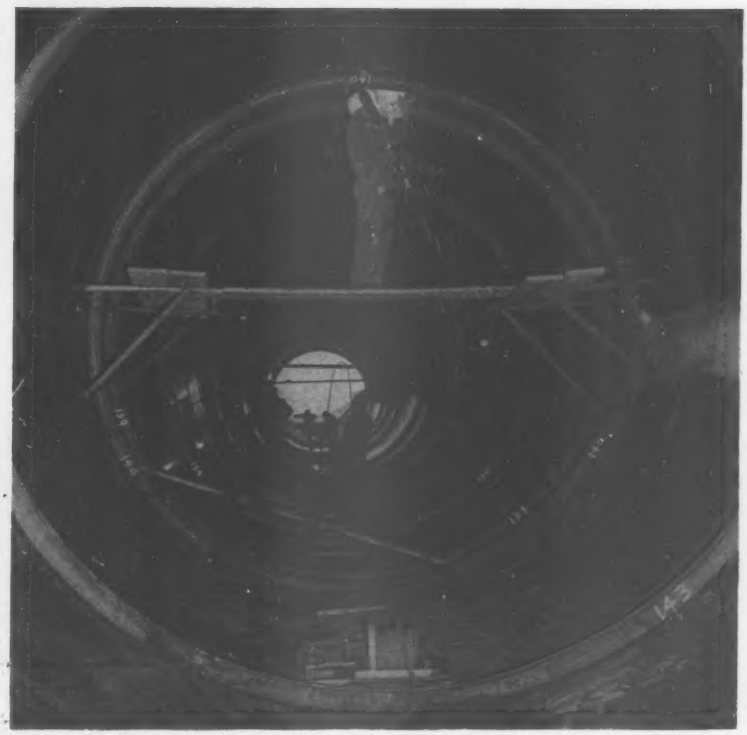


I-beam rings brace steel liner until concrete casing sets.

TRU-LAY *flexible* PUSH-PULLS

FOR

Remote Control Jobs on a great variety of Construction Equipment

Adaptability to all sorts of mechanical situations explains, in large measure, the wide-spread use of TRU-LAY PUSH-PULLS on tractors and their accessories, power shovels, winches, road graders, road oilers, dump trucks, snow plows, engine-driven pumps, rock crushers and other construction equipment.

These dependable Push-Pulls are used for the remote control of hydraulic and air valves, brakes, clutches, transmissions, throttles, chokes, governors, power take-offs, and many other applications.

TRU-LAY PUSH-PULLS are precision products, not gadgets. They provide positive remote-action whether anchorages are fixed or movable . . . for light loads or loads up to 1,000 lbs. . . . and they are effective over short or long distances, up to 150 feet or more.

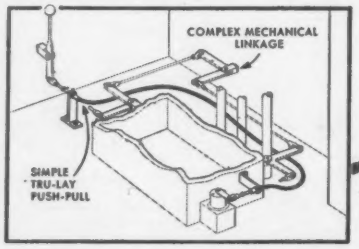
TRU-LAY PUSH-PULLS are dependable and accurate even under the most adverse conditions

They perform effectively under extremes of heat or cold . . . from jet engine temperatures to 70° below zero F. The inner, working member (lubricated for life during assembly) is fully protected by the tough, flexible conduit. Abrasive dusts, dirt and moisture are sealed out. Fittings are cold-swaged to make them integral parts of the control unit. It is a matter of record that we have never heard of a TRU-LAY *flexible* PUSH-PULL wearing out in normal service. Use of these versatile, simple and rugged controls increases ease of operation and means the virtual elimination of maintenance.

Advantages of Tru-Lay Push-Pull flexibility and simplicity are pictured below

Simplicity vs Complexity

Compare the TRU-LAY PUSH-PULL cable in illustration with the mechanical linkage. PUSH-PULLS are simple, have but one moving part, are noiseless and give lifetime service accuracy. Linkages are complex, made of many parts; they wear at many points. Their use brings increased backlash, lost accuracy and vibration rattles.



"Solid as a rod but *flexible* as a wire rope" is a good description of TRU-LAY PUSH-PULL REMOTE CONTROLS. This flexibility makes it possible to snake around obstructions . . . permits the ideal arrangement of all control elements . . . greatly simplifies installation of controls by reducing the number of working parts . . . damps out noise and vibration. Versatile, accurate, adaptable, rugged . . . they are the ideal remote controls for construction equipment.

Bulletin DH-461 will answer your further questions. Write for a copy without obligation

ACCO

Automotive and Aircraft Division

AMERICAN CHAIN & CABLE

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WOOD TOWERS support portion of steel tube during pier spanning.

pipe for the lake crossing were welded. I-beam support rings were used to keep the proper shape of the liner during concrete placing.

Principal subcontractors are Lewis Construction Co., Kennewick, Wash., diversion work and excavation; Gilmore-Skoubye Co., Oakland, Calif., furnishing and placing 12 million lb of reinforcing steel; Lewis Hopkins Co., Pasco, Wash., placing 45,000 cu yd of concrete for the siphon and other structures; Gunderson Brothers Engineering Corp., Portland, furnishing steel pipe and liner; Steel Construction Co., Portland, erection of pipe and liner; and Gustafson Coating and Blasting Co., Spokane, painting.

A. J. Thomas, construction engineer for the Eltopia, Wash., branch office of the Bureau of Reclamation, is in charge of the project for the bureau. Supervisory personnel for E-W Construction Co. include Lloyd Shilling, project manager, and Kenneth Beck, superintendent.

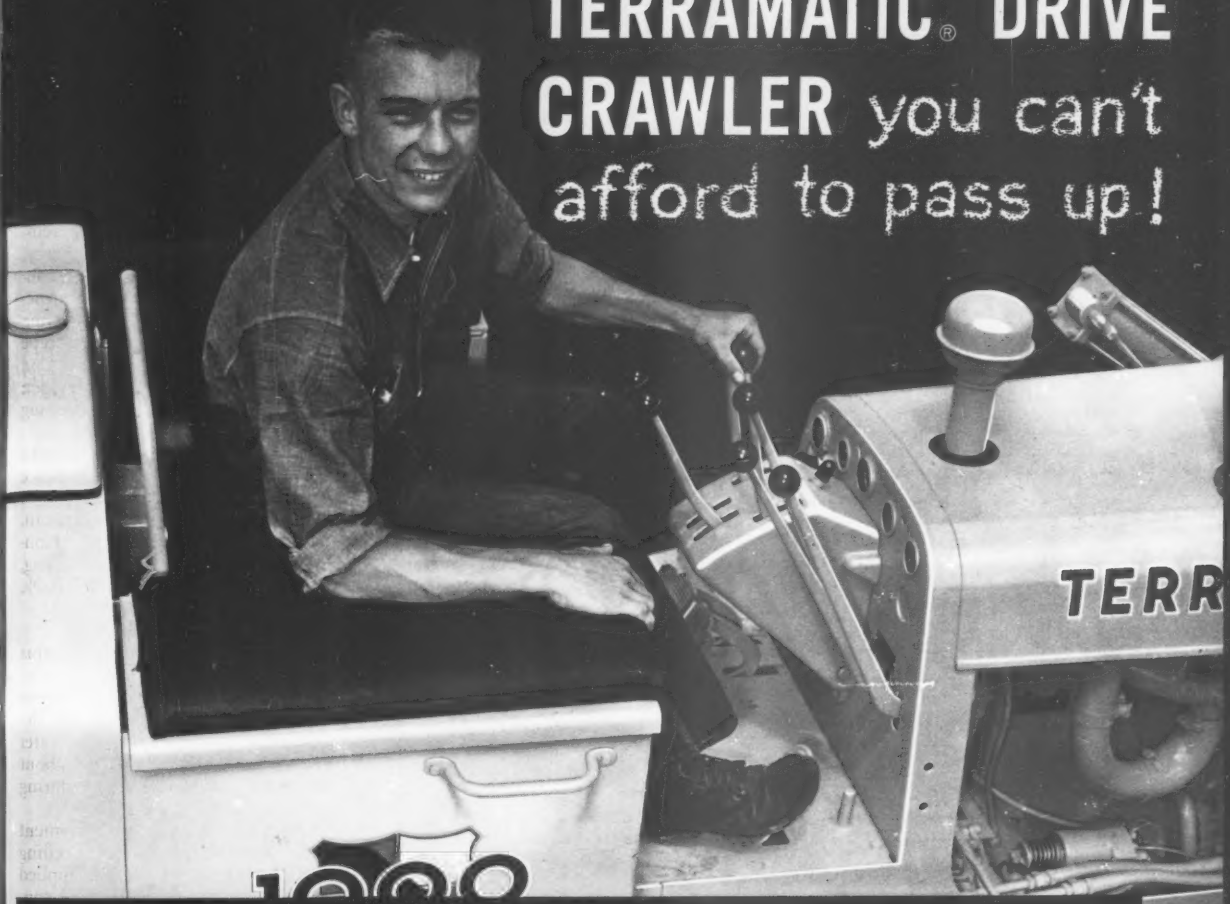
• **Long range program**—The Columbia Basin Irrigation Project started 25 years ago with initial work on Grand Coulee Dam. The irrigation works were delayed by World War II. But now water is available to 383,000 acres. And about 240,000 acres actually used water during the 1958 season.

The present irrigation repayment contracts have an expenditure ceiling that will permit water to be supplied to 455,000 acres by 1963. If these contracts are revised, the Bureau of Reclamation is confident that eventually there will be water service to a million acres of land.

Total construction expenditures up to fiscal '59, have been $524 million. Of this amount, $248 million has been invested in project irrigation works. Annual construction appropriations for recent fiscal years are 1959—$9.7 million; 1958—$10 million; 1957—$14 million; and 1956—$12.5 million.

for the next 60 days

your Case Industrial Dealer is offering a special two-way deal on a **CASE**® **TERRAMATIC**® **DRIVE CRAWLER** you can't afford to pass up!



Deal no. 1

FREE 4-HOUR DEMONSTRATION

Deal no. 2

TRY ONE FOR 10 DAYS

Turn the page for full details

If habit-buying is putting you in a

to "make-the-break" to

Your CASE Industrial Dealer will prove the profit-making difference. Call him now ...tell him where...name your deal!

Deal no. 1

FREE 4-HR. COMPARISON DEMONSTRATION

Your Case Dealer will bring a Case Model 800 or 1000 Terramatic Drive crawler to your job for a *half-day of free work* — no obligation. Compare it with your present equipment for extra ease and simplicity of control. Compare the extra advantages of no clutching, no stalling, no loss of hydraulic power.

Compare the extra speed of Terramatic *in motion* power-shifting with your present *stop-and-shift* machines. Compare the extra maneuverability of full power-turns and counter-rotating-track 360° spin-turns, with the "dead-track" turns of your present equipment.

If this FREE half-day demonstration doesn't convince you, tell your Case Dealer you'll take a go at *"Deal No. 2"*.

Deal no. 2

TRY ONE FOR 10 DAYS

Your Case Dealer is so confident that you will recognize the profit-making advantages of switching to Case Terramatic Drive crawlers that he is making this additional 10-day offer.

For less than the cost of running your own equipment, he will put a Case Terramatic Drive unit on your job for 10 full working days. Take your choice of a 1½ or 2-cu. yd. tractor-shovel, power-angling dozer or power-tilting bulldozer. Put your own operator on it. Clock it. *Keep comparative cost and production records.* If, at the end of 10 days, you don't agree Case is the *best money-maker* you ever had, your Case Dealer will pick it up — No questions asked.

Clock the CASE Terramatic Drive 10-ft. power-angling dozer

Watch the "live" rolling action of that big curved blade as the operator sidecasts a huge windrow of dirt. See how easily he holds a true course with independent power-control on each track. Watch him swing his blade to the other side, as he makes his turn at the end of the pass — without leaving the tractor seat. Now back again, still pushing the windrow of dirt in the same horizontal direction, instead of backing up with an empty blade. Your stop watch will tell you he has increased your production by more than 50%.

By any standard of measurement — Time to do a job ... Yard ... an other comparably-sized piece of equipment you now own cu ... com...

in a profit-squeeze, now is the time to CASE® TERRAMATIC® DRIVE

Clock the CASE Terramatic Drive 2-cu. yd. tractor-shovel

See how smoothly that big bucket bites into the bank and comes up with a heaped load. Listen to that powerful diesel engine purr . . . never lugs down, always maintains full hydraulic power. Watch the operator, without an instant of lost motion, flip two hydraulic levers, step on the accelerator . . . back out . . . counter-rotate . . . and glide smoothly up to the truck or stockpile. No time lost clutching or shifting . . . No needless jockeying. Reverse speeds are twice as fast as conventional crawlers. It all adds up. You get 2 trips to 1 for competitive units.

Clock the CASE Terramatic Drive 8¾-ft. power-tilting dozer

See how easy it is for the operator to tilt the blade from the seat to any ditch-angle. Watch him start the cut on the first pass with up to 12½ tons of push — automatically matched to the load. See how fast the sharp blade tip slices through hardpan and tree roots . . . grubs out big boulders . . . without clutching or down-shifting. Watch your operator spin that husky 8-ton rig around with "turn-table ease" — tilt the blade to the other side on-the-go — and continue cutting at same angle coming back. No empty passes, twice as much work done!

Yards of dirt moved . . . or Cost of work performed — you'll find . . . compete with a CASE TERRAMATIC DRIVE CRAWLER.

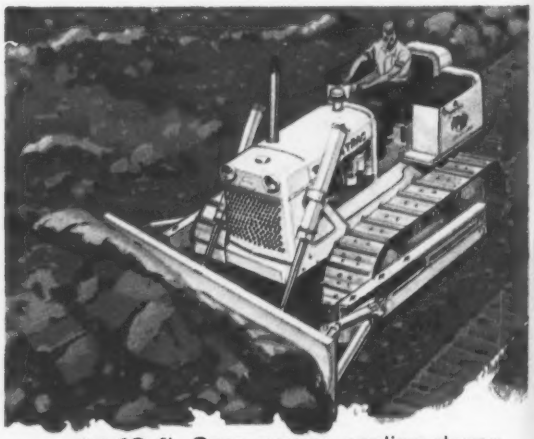
DECIDE NOW to "make-the-break" to... CASE®

TERRAMATIC® DRIVE

Before you leave this page, pick up the phone and call your nearest participating Case Industrial Dealer. If you don't know his name, mail handy coupon below. This special FREE half-day demonstration and *10-day trial offer* is the ONE SURE way to prove to yourself the *profit-making difference* between the conventional equipment you now own and a *years-ahead* Case Terramatic Drive crawler.

Choose the machine you want to clock...

. . . the 2-cu. yd. Case tractor-shovel



. . . the 10-ft. Case power-angling dozer

(Also available with ripper, brush rake, log fork and winch)

MAIL *for quick action*

J. I. CASE CO., Dept. H1419, Racine, Wis., U.S.A.

OK, I'm willing to try Case Terramatic Drive

Please have your Dealer arrange: ☐ Free ½-day Demonstration ☐ 10-Day Trial Lease

on a ☐ Tractor-Shovel ☐ Tilt-Dozer ☐ Angling Dozer

Name _____

Title _____

Company _____

Address _____

City _____

State _____

CC-CL-748N

. . . the 8¾-ft. Case power-tilting bulldozer

CASE®

J. I. CASE CO., RACINE, WIS.
World-wide sales and service

International

VTOL Airliner Carries a Bridge

The British Army's Royal Engineers recently used a 50-passenger vertical take-off and landing (VTOL) airliner to hoist a 103-ft-long bridge section, carry it three miles and set it in place over a river.

The military engineers used the recently-developed Fairey Rotodyne VTOL aircraft for the demonstration. A 90-ft helicopter rotor enables the plane to take off vertically. Once in the air, the plane is powered by two conventional propellers mounted on its stubby wings.

The production version of the Fairey Rotodyne will be capable of carrying loads of more than 20,000 lb at speeds up to 200 mph.

The bridge section used for the experiment was 10 ft wide and 7 ft high. It was not part of an actual bridge, but a section devised for the test. Temporary wooden fins were attached to the section to stabilize it and prevent yawing.

Cairo Collegians to Shave In Solar-Heated Water

Solar energy will heat water for 6,500 students at the world's oldest university, Al-Azhar Theological University, Cairo, Egypt.

University administrators decided that solar-energy heaters would cost only a quarter the price of butane heaters, standard in Egypt.

The heaters will go on the roofs of 41 apartment buildings housing 6,500 students in Al-Azhar University City. Each unit will heat 130 gal of water a day to between 100F and 140F.

WELDED or RIVETED

STEEL PLATE FABRICATION

- ★ Boiler Casings
- ★ Boiler Breechings
- ★ Flues and Ducts
- ★ Condenser Shells
- ★ Condenser Piping
- ★ Heavy Turbine Housings
- ★ Fan and Blower Housings
- ★ Dust Collector Housings
- ★ Industrial Gas Mains
- ★ Expansion Joints
- ★ Hoppers and Bunkers
- ★ Tanks and Vats
- ★ Pressure Vessels
- ★ Wind Tunnels
- ★ Crane Bridge Girders
- ★ Trolley Frames and Trucks
- ★ Rigid Frames
- ★ Roll-Over Fixtures
- ★ Tank Turrets
- ★ Gun Mounts
- ★ Heavy Truck Bodies
- ★ Engine Frames and Bases
- ★ Crawler Frames
- ★ Press Platens and Beds
- ★ Press Columns
- ★ Heavy Machinery Parts and Assemblies
- ★ Gas Seal Hoods for Blast Furnaces
- ★ Furnace Roof Rings
- ★ Design Conversion of Castings to Weldments

MACHINING

- ★ Complete Machining Service—Facilities for Heavy Work of Unusual Dimensions

STRUCTURAL STEEL

- ★ For Buildings, Bridges and Special Purpose Structures
- Drum Gates
- Roller Gates
- Tainter Gates
- Tainter Valves
- Protection Angles

THE R. C. MAHON COMPANY
DETROIT 34, MICHIGAN
Branch Offices in New York, Chicago, Los Angeles and San Francisco

MAHON

TAPER-LOCK STEEL CONVEYOR PULLEYS

Maximum strength with minimum weight...

Unmatched holding power on the shaft...

New mounting simplicity.

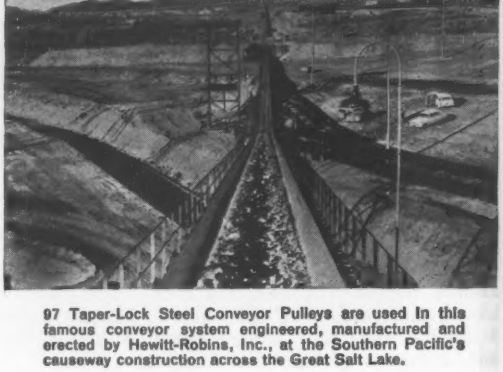
The rims, discs and hubs of these modern conveyor pulleys are *steel*—and they are fused together into jointless drum construction for (1) maximum strength with minimum weight, (2) exclusion of dirt, water, steam, (3) terrific shock resistance.

With the patented Dodge Back-up Bar, welds of full rim thickness are achieved—and the ultimate in strength is assured by submerged arc process welds.

Taper-Lock Steel Conveyor Pulleys *hold*. Taper-Lock provides the equivalent of a shrunk-on fit—there is no "walking" on the shaft. Mounting and demounting are simple. Pulley and bushings mount as a unit. Alignment is easy. And the tapered bushing is wedged into place merely by turning the mounting screws. It is "unlocked" by using the mounting screws as jack screws.

Available in diameters from 6 inches to 8 feet—all face widths. Standard or special rubber lagging available. Ask your local Dodge Distributor—or write us for bulletin.

DODGE MANUFACTURING CORPORATION, 6900 Union, Mishawaka, Ind.



97 Taper-Lock Steel Conveyor Pulleys are used in this famous conveyor system engineered, manufactured and erected by Hewitt-Robins, Inc., at the Southern Pacific's causeway construction across the Great Salt Lake.

DODGE

of Mishawaka, Ind.

CALL THE TRANSMISSIONEER—your local Dodge Distributor. Factory trained, he can give you valuable help on new, cost-saving methods. Look in the *white* pages of your telephone directory for "Dodge Transmissioneer."

George Leonard Retires After 26 Years With TVA

George K. Leonard, chief engineer of the Tennessee Valley Authority, retired last month, ending 26 years of TVA service, mostly in a construction capacity.

Before becoming chief engineer in 1956 he had been chief construction engineer for six years, during the period when TVA's seven steam generating plants were built. The plants add 7,250,000 kw to TVA's power generating capacity.

Before that Mr. Leonard had been either construction engineer or project manager on most of the large hydroelectric projects that TVA built between 1933 and 1950.

A civil engineering graduate of the University of Nebraska, Mr. Leonard worked for the state of Nebraska as a bridge designer, later becoming assistant state engineer. From 1921 until he went with the TVA, he was associated with Woods Brothers Construction Co., first as contracting engineer and later as general superintendent.

Bernard Werner Directs Baltimore Public Works

Bernard L. Werner has been named director of public works for the City of Baltimore for a four-year term at $17,500 a year. He will also serve on the five-man Board of Estimates, the city's top policy-making body.

Mr. Werner has been with the city for over 30 years and has headed the Bureau of Water Supply for the last five years. He is a graduate of Carnegie Tech and the Armed Forces Industrial College.

Careers

Business

Earl S. Evans, engineer-in-charge of the project section, has been promoted to chief engineer of the steam turbine department at Allis-Chalmers, Milwaukee. He joined Allis-Chalmers in 1951 after working with Ebasco International.

Carl H. Wittenberg, partner and cofounder of Twaits-Wittenberg Co., Los Angeles, contractors and engineers, has acquired full ownership of the firm. The company is currently working on more than $40-million worth of construction in the Los Angeles area.

Orlen E. Baker is manager of the new petroleum sales division set up by Infilco, Inc., Los Angeles. He directs company research and field testing. Mr. Baker, a chemical engineer, has made extensive studies of water and brine treatment for the secondary recovery of oil.

Wilson C. Rich, Jr. takes over as chief process engineer for the J. G. White Engineering Corp., New York City. Mr. Rich, an independent consulting engineer for five years, has also worked with Esso Research and Engineering Co., and the Carbide and Carbon Chemicals Corp.

Reid S. Parramore and **Eugene Smith** have been appointed regional sanitary engineers for Yeomans Brothers Co., Melrose Park, Ill., manufacturers of pumping and sewage treatment equipment. Mr. Parramore will work out of Wilmington, Del., serving Pennsylvania and the coastal states from Maryland to South Carolina. Mr. Smith will have headquarters in New York City and will service New England, New York and northern New Jersey.

John F. Schrunk assumes the dual position of assistant manager of Cornell Manufacturing Co., Portland, Ore., and manager of Water Engineering Consultants, an allied company. Before coming to Cornell Manufacturers, he spent seven years as a government engineer working on water projects throughout the world.

Everett P. Welch, a civil engineer, takes over as manager of engineering services for the Pennsylvania Power & Light Co. after serving six years as assistant manager.

Professor John J. Hennigan, Jr., of Syracuse University's department of civil engineering, has become affiliated with K. G. Woodward & Associates, consulting engineers, Webster, New York. He has also served as assistant city engineer for Summit, N. J., and director of sanitation for Syracuse, N. Y.

BEN H. PETTY
Renowned Engineer and Author

WISHFUL THINKING

Who *knows* what the average life of any pavement will be in the future? Houdini type guessing or wishing certainly is unreliable.

Specific examples of exceptionally long life for slab pavement may be cited, while overlooking failures at say 15 years of life.

Let's hope that, under present advanced design and construction specifications, all pavement types will have much longer and satisfactorily useful lives than during the past.

But to say that rigid type pavements will have "50 years life and more," as current advertising states, is wishful thinking, pure and simple.

In what condition will the riding surface of that rigid type pavement be, after even half of that *hoped for* life?

A typical example is the more than 100 miles of the original 160-mile Pennsylvania Turnpike, resurfaced with heavy-duty Asphalt paving, after only 16 years of life.

Many similar examples may be cited. All such glaring examples tend to discredit the over-zealous claims for concrete pavements.

Ben H. Petty

Presented as a Public Service by
THE ASPHALT INSTITUTE

WATER WORRIES?

Have them controlled efficiently, economically, by dewatering specialists from the John W.

STANG *Corporation*

Los Angeles • Omaha • Mobile • Tacoma

Kinnear Rolling Doors

Kinnear *originated* the upward-acting door with the curtain of interlocking steel slats. For more than half a century, Kinnear has built doors *exclusively*—your assurance of highest quality. Write for Kinnear catalog!

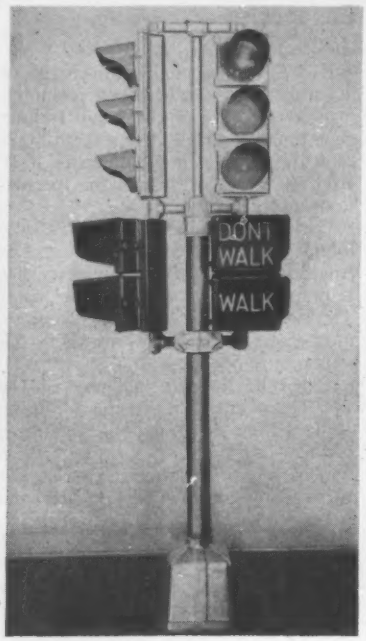
The KINNEAR Manufacturing Co.

KINNEAR ROLLING DOORS Saving Ways in Doorways

1820-40 Fields Ave., Columbus 16, Ohio

1742 Yosemite Ave., San Francisco 24, Calif.

New Products



Pedestrians Are Directed By Neat, Trim Signals

The MP-120 pedestrian traffic signal is designed for crossings 50 to 60 ft wide.

"Walk—Don't Walk" legends can be replaced with arrow indicators. Prismatic lens for the unit is 9x11 in. CROUSE-HINDS, SYRACUSE 1, N. Y.

Plastering Machine Allows Varied Flow for All Jobs

The "Spray King" plastering machine has a double-piston pump operated by a 12½-hp Wisconsin engine. It allows a maximum coverage of 450 sq yd per hour with material ½ in. thick. This rate of flow can be maintained through up to 150 ft of hose, the maker says.

Flow variations are made with a three-speed transmission with overlapping engine rpm control. This allows the operator to get the exact volume required for the job at hand. An extremely low ratio in the lowest gear fits the machine for acoustic and fine texture work.

Ample reserve power and a direct-drive train have been designed into the Spray King for minimum vibration and long job life.

The machine is built with a 10-cu ft hopper and rubber wheels, plus a drawbar for highway towing. CHALLENGE MFG. CO., LOS ANGELES, CALIF.

Teardrop Curves Simplify Highway Design Drawing

A set of teardrop curves is offered to simplify highway interchange design. They can be used in any layout work involving circles and arcs, and are said to be especially effective in short-radius work.

The templates do away with the time-consuming process of drawing with a combination of curves to get one curve, the manufacturer states.

All curves in the series have double tangents, two radial lines and a hole for marking the center of the arc.

The templates are made of transparent plastic. Available singly or in sets as radius or degree curves to the Arc Definition, 11 curves to the set. KEUFFEL & ESSER CO., ADAMS & THIRD STREETS, HOBOKEN, N. J.

Metal-Panel Buildings Have Prefitted Connections

A low cost, all-steel, portable maintenance building, designed for "do-it-yourself" assembly by an unskilled crew, is available for construction companies.

The "Stran-Master" comes in a range of widths from 12 to 120 ft. No cranes or heavy equipment are needed for erection, the manufacturer states. There are no nails or spikes to drive; all framing connections are bolted through factory-drilled holes.

The low-profile building has ribbed wall and roof panels available in six colors as well as the standard metal finish. The new color coating is a double protective layer of vinyl-aluminum applied direct to the zinc-coated steel panels at the factory. It is not paint and will not chip, peel, fade or crack, the maker reports. STRAN STEEL CORP., DETROIT 29, MICH.

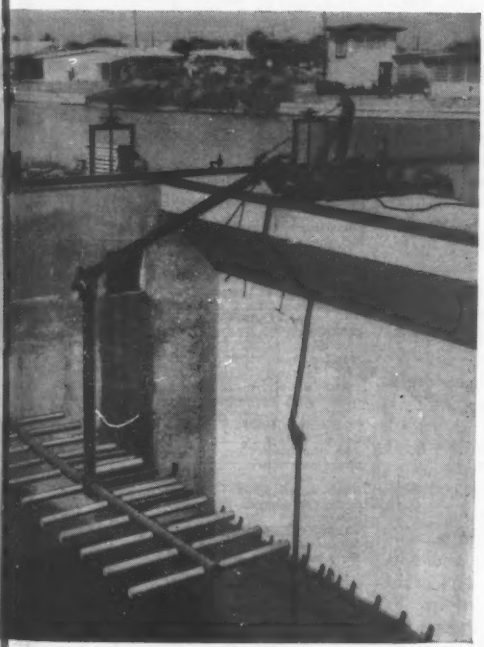
Portable Air Compressor Powers Light Wagon Drill

A single stage, piston type, 125 cfm portable air compressor is said to have enough 100 psi air to power two heavy or three medium breakers, one medium or two light sinkers or one light wagon drill.

The engine and compressor of the machine are built as one unit. Because it has only one crankshaft and one crankcase, the need for a clutch or coupling is eliminated. Engine speed varies according to air demand. A 12-volt electrical system aids cold weather starting. LE ROI DIV., WESTINGHOUSE AIR BRAKE CO., MILWAUKEE 1, WIS.

More than five miles of extra heavy galvanized Wrought Iron Pipe, from 1½-inch to 3½-inch, were used in the construction of the Treasure Island, Florida, Sewage Collection Plant.

Wrought Iron Pipe provides a bulwark against corrosion at Florida's Treasure Island Sewage Treatment Plant



Included in this system are eight pneumatic ejector lift stations which are supplied with compressed air transmitted in Wrought Iron Pipe from the blowers and storage located at the Treatment Plant.

Compressed air piping used in the activated sludge process must provide maximum operating life, minimum maintenance.

At the new Treasure Island, Florida, Sewage Treatment Plant, consulting engineers specified corrosion-resistant Wrought Iron Pipe for this service. Severe internal corrosion and clogging from loose rust occur with ordinary piping materials in this service. But not with Wrought Iron. Its corrosion product is dense and highly adherent, and actually *protects* the underlying metal from further corrosive attack.

Today, specifiers and plant operating men are getting a Wrought Iron that is the most versatile material yet developed to help fight corrosion. New 4-D Wrought Iron faces corrosive attack with far greater resistance, even, than standard Wrought Iron, its dependable predecessor.

4-D was achieved by substantially increasing the deoxidation of the base metal, slightly increasing the phosphorous content and using a more siliceous iron silicate. 4-D is available now from your distributor. Write us for new 4-D Wrought Iron literature. A. M. Byers Company, Clark Building, Pittsburgh 22, Pa.

City of Treasure Island Sewage Plant Improvement
Consulting Engineers: Gilbert W. Clifford & Associates
Piping Contractors: Paul Giuliani & J. E. Milam Co.

BYERS 4-D WROUGHT IRON

TUBULAR AND FLAT ROLLED PRODUCTS

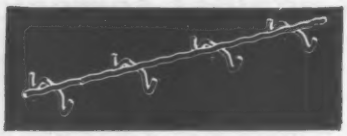
ALSO AMBALLOY ELECTRIC FURNACE QUALITY STEELS AND PVC PIPE AND SHEET

Corrosion costs you more than Wrought Iron

TIME SAVED TWICE! with SYLGAB

Continuous BAR BOLSTER SUPPORTS

1. The right material at the right time. No delays due to late delivery or mixed-up shipment.
2. Designed for speedy, easy installations. Allows fast pouring due to high rigidity.



A RUGGED SUPPORT FOR SLAB REINFORCEMENT

Made in 5' lengths of hard steel wire supporting bar with wire legs spaced either standard 5" distance or directly under each slab rod (4" min.)

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Member Concrete Reinforcing Steel Institute

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Manufacturers of Steel and Wire Accessories for Concrete and Fireproof Construction.

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STRAIGHT AND COIL WIRE
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FORM SPACERS • BAR ACCESSORIES

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Steel and Concrete Beam Spans for . . .

Two Virginia Highway Bridges

At $269,993, McDowall & Wood, Inc., Salem, Va., was successful bidder for two bridges on Interstate Rt. 52 in Wythe County, Va., near Pulaski. The award by the Virginia Department of Highways was 1.2% below the second and 16% below the high of thirteen bids. H. M. Morecock, Jr., Bristol, is the engineer.

The contract breaks down like this:

Bridge	Approx. Length	Clear Rdwy. Width	Approx. Cost Total	Cost per sf/ rdwy.
Twin bridge, 12 stl beam spans	298 ft*	30 ft*	$211,143	$11.80
Single bridge, 4 prestr conc beam spans	225.5 ft	24 ft	58,850	10.87

* Each bridge

The steel beam spans for the twin bridge are eight at 47 ft and four at 54 ft. The prestressed concrete beam spans for the second bridge are two at 60.5 ft and two at 51 ft.

Wages include: carpenter $2.00; reinforcing ironworker $1.30; welder $1.78; crane, derrick and dragline operators $2.40; unskilled laborer $1.00; bulldozer operator $2.00; truck drivers $1.25; mechanic $1.65.

1C McDowall & Wood, Inc., Salem, Va.	$269,993
2 Walder & Flournay, Inc., Richmond	273,139
13 B. F. Parrott & Co., Inc., Roanoke	321,701

Bids: 6-3-59 Items	Unit	Quantity	Unit Prices 1 C	2
Twin 12 Steel Beam Span Bridge				
Superstruct, conc cl A, AE	cy	883.2	$60.00	$60.00
steel, reinforcing	lb	97,765	0.13	0.13
structural	ls	job	65,500	65,000
bridge railing	lf	1,184	6.15	6.00
Substruct, conc cl A, AE	cy	924.4	48.00	50.00
cl B, AE	cy	227.4	38.00	45.00
steel, reinforcing	lb	138,594	0.13	0.13
H piles	lf	1,100	5.50	6.00
excavation, struct, cl A	cy	729	3.50	4.00
cl B	cy	237	3.50	10.00
Concrete slab gutter	cy	13.8	10.00	10.00
riprap	sy	1,431	7.50	9.00
Concrete Beam Span Bridge				
Superstruct, conc cl A, AE	cy	193.6	60.00	60.00
steel, reinf	lb	29,721	0.12	0.13
prestr conc beam, 50'9"	ea	10	1,226	800.00
50'3"	ea	10	1,461	1,000
bridge railing	lf	446	6.15	6.00
Substruct, conc cl A, AE	cy	146.3	42.00	60.00
steel, reinforcing	lb	23,051	0.12	0.13
H piles	lf	490	5.50	6.00
excavation, struct, uncl	cy	251	3.00	3.00
conc block slope protect	sy	339	5.00	6.00

Completion schedule: 240 calendar days
Liquidated damages: $35/day

Pedestrian Underpass on Rigid Schedule

Existing utilities and a tight time schedule pose problems for the contractor on this pedestrian underpass and water main gallery job under the Northwest Expressway in Chicago.

Major items in the contract must be completed by Oct. 15 so as not to interfere with necessary paving on the Expressway. Work is for the Department of Public Works and Buildings, Division of Highways, Illinois. R. R. Bartelsmeyer, Springfield, is chief highway engineer.

Keno Construction Co., Inc., Highland Park, Ill., took the contract at $146,554, on a bid 5.8% below the second and 23% below the high bid.

The 225.68 ft reinforced concrete pedestrian underpass will have a 12 ft span and a height of 9 ft. The 80x80-in. precast reinforced concrete flat base water main gallery will be 356 ft long, and will house a 36 in. water main relocation under the Expressway.

Class X concrete must acquire a compressive strength of 3,500 psi and 650 lb modulus of rupture at 14 days. Precast concrete pipe must conform to ASTM specifications C76-57T for reinforced concrete pipe and meet strength requirements for Class IV pipe.

Prevailing wages include: carpenter $3.95; crane operator $3.55; common laborer $3.10.

The bidding included:

1C Keno Constr. Co., Inc., Highland Park, Ill.	$146,554
2 E. H. Marhoefer Jr. Co., Franklin Park, Ill.	155,577
7 L. B. Strandberg & Son Co., Inc., Arlington Heights, Ill.	189,848

Bids: 7-2-59 Items	Unit	Quantity	Unit Prices 1 C	2
Conc, class X	cy	596	$52.00	$54.25
Reinforcement bars	lb	80,147	0.13	0.123
Membrane waterproofing	sf	9,950	1.09	1.00
MH, type A, 4'ϕ, with type 1 frame, closed lid	ea	3	300.00	276.00
Catch basin, type A, 4'ϕ w type 1 frame, open lid	ea	1	230.00	382.00
Inlet, type A, type 10 frame	ea	4	145.00	530.00
Storm sewers, CSP, 6"	lf	166	3.92	5.30
ESCP, 18"	lf	67	18.40	29.00
CMP, perf, 8"	lf	726	2.75	3.20
8"	lf	18	2.60	8.50
Manhole, drop	ea	1	3,540	1,505
access	ea	2	400.00	647.00
Trench backfill	cy	412	4.03	6.40
Embankment, porous granular	cy	5,368	4.20	4.15
PC concrete sidewalk, 5"	sf	5,024	0.77	0.58
Ceramic wall tile	sf	3,576	1.64	1.54
Pedestrian barrier	lf	254	9.00	8.53
Water main gallery	lf	356	99.76	126.80
Electric handhole	ea	2	690.00	795.80
Rigid steel conduit, 2"	lf	385	2.90	3.20
Cable, 1/C #4 AWG, 600V	lf	1,095	0.98	0.71
Service pole, instal	ea	1	184.00	191.00
Fluorescent Luminaire, clp	ea	18	207.00	191.00
Service cabinet	ea	1	184.00	313.00
Rigid steel conduit, 1"	lf	300	1.67	2.00
Pull box	ea	18	23.00	21.00
Cable, 1/C #10 AWG, 600 V	lf	1,300	0.40	0.31
Trench & backfill	lf	385	1.15	0.81
Pavement replacement	sy	24	9.60	10.00
Excavation, special	cy	705	4.15	2.85
Sidewalk removal	sf	300	0.18	0.20

Complete: 10-15-59
Liq. dam. $100/day

Longer bit life— with *new* Sandvik Coromant Bits

Sandvik Coromant Tungsten Carbide (Microphoto) Uniformity of size, even distribution of grain are marked. Free from porosity and impurities —therefore stronger, longer-lived.

Low quality Tungsten Carbide (Microphoto) Black marks are contaminations caused by deficient production control. They weaken the carbide, reduce its working life.

NEXT time you buy bits, specify Sandvik Coromant because they give more footage per bit, lower drilling costs. Here's why:

1 Only first-quality tungsten carbide is used —as shown in the microphotos above. This means less wear, longer life and a better job.

2 The bodies are precision-made of high quality alloy steel—tough enough to take the strain throughout the extra-long bit life.

3 The bigger Sandvik Coromant bits are all of X-design, which prevents rifling. No wonder Sandvik Coromant inserts are the most widely used in the world, drilling more than one billion feet every year.

SANDVIK COROMANT bits are supplied through Atlas Copco, the world's largest manufacturer of rock drills, who also supply Sandvik Coromant integral steels — the most widely used in the world — and Sandvik Coromant extension steel equipment.

Sandvik Coromant Detachable Bits are Available in the following Thread Sizes and Bit Diameters

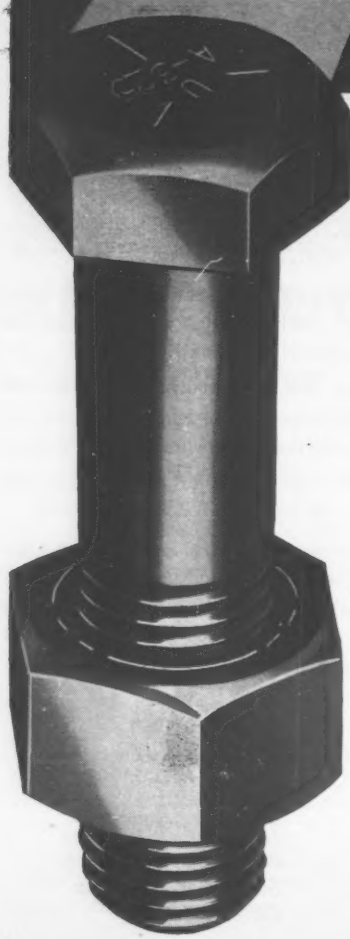
Type	Thread	Available Diameters, in Inches														
		1¼	1⅜	1½	1⅝	1¾	1⅞	2	2⅛	2¼	2⅜	2½	2⅝	3	3½	4	4½	5
SHOULDER	TAPER	x	x	x	x													
	F		x	x														
	113		x															
	H			x	x	x	x	x		x								
	115			x	x													
	D						x	x	x	x	x	x	x					
	K													x	x	x	x	
BOTTOMING	1" Rope				x	x	x	x		x								
	1¼" Rope						x	x	x	x		x		x				
	400						x	x		x		x						
	1½" Rope											x	x	x	x	x		
	600											x	x	x	x			
	700													x	x			
	J7.5															x	x	
	2" Rope														x	x	x	x
	1000																x	

Write or phone today for further details to either of the addresses below:

610 Industrial Avenue
Paramus, New Jersey
COlfax 1-6800

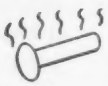
Atlas Copco

930 Brittan Avenue
San Carlos, California
LYtell 1-0375



REPUBLIC HIGH STRENGTH BOLTS

keep these four High-Cost, High-Risk fastening problems *OUT* of the picture



No Hot Rivets

Because this structure is being assembled with Republic High Strength Bolts, there are no hot rivets to endanger personnel or property. No fire hazard—no special precautions necessary. Work proceeds more safely, and more quickly as well.

No Elaborate Scaffolding

This expense is ended because large crews and heavy equipment are not required. Republic High Strength Bolts can usually be applied from structural members. Saves both time and money.

No Costly Crews

Only two men, one with a torque wrench, the other with a standard hand wrench, can apply Republic High Strength Bolts. Regular steel erectors can learn the work quickly. No need for expensive, highly-skilled, and hard-to-find riveting crews.

No Excessive Noise

The extreme racket of riveting guns is obsolete with Republic High Strength Bolts. Pneumatic impact wrenches reduce noise by 50%—a vital consideration around schools, congested areas, and hospitals.

FOR ALL THESE ADVANTAGES PLUS STRONG, SAFE CONNECTIONS
CALL YOUR REPUBLIC REPRESENTATIVE OR MAIL COUPON

EXCELLENT LIGHT, VENTILATION with beauty and economy, are features of Truscon VISION-VENT® Window Walls—shown here in North Hagerstown, Maryland's new high school*. Select practically any type of window... choice of high-gloss panel colors for single- or multi-colored effects... steel or aluminum. Send coupon for full information.
(*Architects: McLeod & Ferrara, Washington, D.C.)

SAVINGS IN FLOOR SPACE, with support for heavy loads, were obtained by using Republic High Strength Concrete Reinforcing Bars in Washington National Insurance Company Building, Evanston, Illinois. Columns using 11 No. 18S butt-welded high strength bars, with a possible design stress of 30,000 psi, measure only 26″ in diameter. Republic High Strength Reinforcing Bars provide a minimum yield point of 75,000 pounds per square inch and meet new ASTM Specification A-431-58T. Mail coupon.

FAST, EASY ASSEMBLY of Republic Sectional Plate Pipe saves time, money. It is engineered and fabricated at the factory—is easily assembled on the job with a minimum of labor and equipment. That's why full round pipe of 12-gage plates, 84″ in diameter, was used to construct this 90-foot cattle pass near Boise, Idaho. For details, send coupon.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
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Please send more information on:

- ☐ High Strength Structural Bolts
- ☐ VISION-VENT Window Walls
- ☐ Sectional Plate Pipe
- ☐ High Strength Reinforcing Bars

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

"Nothing speeds job cycles like *TORQMATIC DRIVE*"

You find it out on the very first job: no equipment you'd put extra money into pays it back as fast as equipment with TORQMATIC DRIVE.

First place, you need fewer units. For a TORQMATIC rig works rings around anything with a stick-shift. In trucks, for example, it means bigger units that make more trips per day. Dozers and scrapers make faster passes. Shovels take full bites every time.

What's more, TORQMATIC equipment *keeps* working. A fluid drive absorbs shocks that mean frequent repairs to ordinary equipment. That also protects engines from strain – drive-lines from shock-load damage. The pay-off: TORQMATIC *users slash operating costs!*

What's all this mean to you? Simply that money-wise contractors look beyond the somewhat higher price tag on a TORQMATIC unit. They know you *can't* lose on equipment that handles bigger jobs—with fewer units—at lower cost—than anything else around.

And remember—you can collect all the TORQMATIC savings in nearly every type—and over 100 makes—of construction equipment. Just ask your equipment dealer—or write:

Allison Division of General Motors, Indianapolis 6, Indiana
In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario

Allison TORQMATIC

TORQMATIC® DRIVES

THE MODERN DRIVE FOR MODERN EQUIPMENT

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE PARTITION—SCORED Per M. lots of 2,000 pieces or over,			STRUCTURAL CLAY TILE—LOAD BEARING—SCORED Per M. lots of 2,000 pieces or over,			BRICK Per M. in quantity		LIME Per ton, in paper, Carload lot,		
	3x12x12 in.	4x12x12 in.	8x12x12 in.	8x12x12 in.	10x12x12 in.	12x12x12 in.	Common backing	Straight hard	Hydrated finishing	Common hydrated	Pulverized
Atlanta	$170.10pe	$153.25pkke	$306.55pe	$344.85pe	.....	.....	$31.50uu	$33.75uu	$36.50hh	$28.50hh	$28.50hh
Baltimore	217.00	231.00	434.00	491.00	602.00	690.00	35.00	41.00	35.60	23.20	.....
Birmingham	135.00pss	152.00pss	.....	30 .00p	376.00p	465.00p	27.00ff	38.00jj	38.28mm	20.87mm	26.33gmm
Boston	232.00†mm	248.00†mm	463.25†mm	556.00†mm	.....	.....	41.50p	56.50p	40.20§	32.20§	.....
Chicago	137.00ll	149.00ll	280.00ll	.....	.....	.....	32.00	34.00	38.00ll	35.20ll	.....
Cincinnati	160.00mmyy	172.00†mmyy	327.00jdmm	390.00†mmyy	425.00†mmyy	500.00†mmyy	48.00jk	47.00jk	29.10†mm	35.10†mm	29.10†mm
Cleveland	200.00tt	213.00tt	.....	453.00tt	.....	693.00tt	41.75tt	45.75gtt	32.75ptt	28.00ptt	.....
Dallas	155.00	155.00	306.00	370.50	452.25	560.00	27.50	49.00	41.80	24.58	28.50
Denver	170.00	185.00	310.00	310.00	390.00	442.00	30.00	54.00	48.00p	42.00p	46.00p
Detroit	242.00mm	258.00mm	483.00mm	548.00mm	723.00mm	827.00mm	51.50pmm	52.00pmm	38.00mm	30.40mm	40.00mm
Kansas City	158.00	158.00	312.00	312.00	400.00	500.00	34.00	34.00	36.26	34.26	29.76
Los Angeles	r	r	r	r	r	r	38.00uu	.....	38.00mnll	38.00mnll	39.00mnll
Minneapolis	192.00pe	215.00pe	437.00pe	215.00pee	.....	.....	45.60ype	54.00ype	49.00bbe	38.00bbe	52.00bbde
Montreal	168.78aagee	180.93aagee	325.00aagee	220.00qee	400.00qee	.....	48.25bbll	56.30bbll	39.00	22.00	13.25
New Orleans	198.00	198.00	370.00	370.00	.....	.....	42.00	55.00	44.00	32.00	32.00
New York	177.00h	189.00h	283.00ch	285.00hn	.....	.....	44.00p	.....	50.00p	40.00p	.....
Philadelphia R*	202.10ss	215.60ss	323.40ss	485.10ss	.....	.....	40.00mm	50.00mm	27.60mm	21.50	21.50
Pittsburgh pp	200.00t	213.00t	400.00t	453.00t	607.00t	693.00t	39.00t	46.00t	38.00t	33.00t	34.00t
St. Louis	172.00mmpp	180.00pp	375.00pp	401.00ppp	459.00pp	621.50pp	44.00mmpp	45.50pp	1 00aapp	80aapp	1.35aapp
San Francisco	156.85*mm	177.10*mm	235.30dd*mm	159.40qqmm	.....	.....	43.00*mm	43.00*mm	29.24mm	29.24mm	31.74mm
Seattle	235.00pt	270.00pt	490.00pt	265.00pu	.....	.....	48.00t	62.00t	52.00bbt	38.00bbt	4.50mbbt
Toronto	158.00rr	173.00rr	336.00rr	263.00frr	378.00rr	.....	35.00rr	63.00rr	38.00mm	34.50mm	33.50mm

*§ F.o.b. yard. *• F.o.b. plant Stockton. *† F.o.b. yard Roxbury. *a Smooth. *b $4.50 del. *c 8 x 12 x 12 in.-6 cell. *d Pulverized hot. *e less 8% disc., 10th., 8 x 8 x 12. *g Lumps, $26.72. *h F.o.b. trucks, job site N.Y.C. *i 60 lb sacks. *j Truck load or over. *k $1.00 discount per M, 10 days. *l Red face. *m Per bb. 180 lb. processed. *n 7¾ x 7¾ x 12. *o Mason's double hydrated pressure. *p Truck lots. *q Provincial and Municipal tax extra (8%). *r Not used: earthquake danger. *s 8 x 16 x 12. *t less 2% disc., cash. *u Incl. Federal tax. *v Sand lime. *w 5 x 8 x 12. *y Chi common. *z Pebble; 80 lb sack. *aa 50 lb sack. *bb LCL. *dd 8 x 12 x 12. *ff 80% common. *gg Smooth. *hh less 2½¢ disc., cash. *ii F.o.b. plant. *jj rough; smooth; $40. *kk 3¼ x 11½ x 11½. *ll less 2% disc. 10th. *mm less 2% 10 days. *nn F.o.b., L. A. *oo less 2%, 30 days. *pp add 2% sales tax. *qq 8 x 8½ x 11½. *rr 2½% disc., 10 days. *ss 8% disc., 10 days. *tt less 2% disc., 15th. *uu less 50¢/M, 10 days. *vv 4000 pcs. and over. *R revised. f off. 3/1/59.

* Philadelphia prices revised, watch for analysis

PAINT, ROOFING—F. O. B. CARLOAD LOTS

	RED LEAD Per 100 lb. in 600 lb. (Approx.) bbl. F.O.B. Plant Dry a C	WHITE LEAD Per 100 lb. in 100 lb. cases in oil	READY-MIXED PAINT Per gal., drums Graphite b	Aluminum c	Ferric Oxide d	ROOFING SUPPLIES; Carload lots f.o.b. factory Rolls, slate surfaced, 65–90 lb. per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Asphalt coating per gal.	Tar pitch 360 lb. bbl. per ton
Atlanta	$13.75ggJO	$24.00ggJ	$3.59	$3.86	$3.31	$3.90hkk	$2.12kk	$2.40kk	$0.67kk	$63.50kk
Baltimore	17.50fpp	24.00	3.00	4.40	3.80	2.78	4.25	4.25	.48	56.75
Birmingham	26.00tJ	29.00†J	3.90J	3.40J	.....	3.30†mm	3.45tt†mm	3.45tt†mm	.82ffmm	45.00eemm
Boston	24.95toomm	26.90†mmm	.....	.....	.....	3.91g	3.64g	.83g	.50g	58.00g
Chicago	15.25rJqqpp	24.00†J	.....	.....	.....	3 84kkk	2 76kkk	3 00kkk	48.0066kkk	57.70†kk
Cincinnati	15.25†JO	24.00†J	.....	.....	.....	2.87mm	2.02mm	2.42mm	.428ymm	55.90Hmm
Cleveland	25.65†	26.90†	2.46gg	2.70gg	3.08gg	2.93q	2.05o	2.42o	.484y	49.00gg
Dallas	22.50	23.50M	.....	3.25B	.....	3.00u	3.00o	3.00o	.470	66.00kk
Denver	23.00n	24.00	3.98	5.3C	3.70	2 86	2.12o	2.80o	.50ff	50.00
Detroit	15.25r	24.00rr	2.70mm	3.05mm	2.70mm	2.82mm	2.05mmll	2.42mmll	36ffmm	49.00mm
Kansas City	26.90lqqoo	25.65	3.99	5.43	3.01	4.01mm	2 72mmm	2.72mmm	.80y	.....
Los Angeles	24.00O	24.00	3.30n	4.50n	4.20n	3.40nkk	2.40nkk	l	.75nykk	l
Minneapolis	16.23N	21.50kk	.....	.....	.....	3.28kk	2.59hkk	2.42hkk	.438kk	50.00rkk
Montreal	19.45O	26.00wtt	5.53Dfft	6.65affc	5.10kfft	5.40	4.65f	4.65f	1.60	4.40uu
New Orleans	23.00Jpp	24.00J	.....	.....	.....	2.78	1.98	2.85	.680	45.50
New York	25.65oo	26.90	.....	.....	.....	3.29	2.16e	2.45e	.438s	49 00*
Philadelphia R*	15.25Omm	24.75mm	3.35mm	3.90mm	2.65Rmm	4.70	3.60	3.85	.515	50.00
Pittsburgh K	21.00qqJ	24.00J	2.20tEJ	2.25tFJ	2.25tGJ	3.57sH	2.75sH	2.95H	.48H	55.00H
St. Louis K	25.65†m	26.90	.....	.....	.....	3.20tmmm	2.31hhK	2.90hhK	.428yK	62.00K
San Francisco	26.70mm	26.90mm	3.20mm	4.30mm	3.50mm	2.95mm	1.97aaimm	3.10mm	.46ff	54.00
Seattle	13.35HO	24.00H	.....	4.19ceffJ	.....	3.64qccH	3.16hccH	.....	.55cc	.....
Toronto	14.45	19.35	5.15J	6.18J	5.95J	2.70	2.40mm	2.40o	1 01§	49.00A

*† Delivered. * Note: Red lead in oil 50% higher than white lead in oil. *• Aver. wt. approx. 425 to 550 lb drums. *a Red lead prices change frequently due to pig lead price changes. *b U.S. War Dept. Spec. 3-49A. *c ASTM Spec. D266-31. *d 80% minimum ferric oxide. *e Per 108 sf roll. *f Per 432 sq ft. *g F.o.b. yard Roxbury. *h Per roll, 65 lb. *i Net carload prices, Minneapolis and vicinity. *j 45 gal containers. *k Over 80% ferric oxide. *l Not used. *m 100 lb. keg. *n F.o.b. city. *o Per 90 lb roll. *p 6-drum, 50 gal each. *q Per 90-lb r ll. *r F.o.b. factory, Chicago. *s Truckload. *t Incl. Federal tax. *u Per 90-lb square. *v Per ton. *x Ready-mixed. *y 55-gal container. *z Drums. *aa 15 lb. *bb Roofers coating and cement. *cc LCL, truck delivery. *ee Asphalt pitch in 100 lb package. *ff 5-gal drums. *gg F.o.b. factory. *hh Incl. freight. *ii Per 324 sf roll. *jj Asbestos roof coating. *kk less 2% disc., 10th. *mm less 2% disc., 10 days. *oo 100 lb bbls. *pp 50 or 100 lb bags. *qq 500 lbs or more *rr F.o.b. plant, Detroit. *ss 50 lb bbls. *tt 25 lb kegs. *uu 250 lb bbls. *A 400 lb barrels. *B ASTM Spec. D962–48. *C 96%. *D Std. black. *f Milt. spec.: E TTP27; F TTY81; G TTP31. *H less 2% disc., cash. *I Per 100 lb. *J less 1% disc., 10 days. *K add 2% sales tax. *L CL. *M 1 ton or more. *N under 500 lbs, add $1 *O 50 lb. bag. *R revised

* Philadelphia prices revised, watch for analysis

PLASTER, VERMICULITE AND METAL BUILDING SHEETS & TUBING

	PLASTER‡		VERMICULITE‡			PERLITE‡		ALUMINUM SHEET†	STAINLESS STEEL† SHEET-TYPE 302g		COPPER WATER* TUBING-TYPE L 2000 ft lots per ft	
	Neat per ton	Gauging per ton	Home Insulation pellets	Plaster aggregate	Concrete Aggregate Untreated	Plaster Aggregate	Concrete Aggregate Untreated	Flat .102" th 36"x108" & 48"x144"	Corr roof .032" th 35"x12'	20 ga 48"x96"–120"	28 ga 36"x120"	⅜"b	½"c
			per bag of 4 cu ft					per lbjt	per sku	per cwtmh	per cwtmm		
Atlanta	$32.00ss	$42.00ss	$1.55ss	$1.65ss	$1.80lss	$1.65ss	$1.65ss	$0.440noo	$8.83n	$65.68nxx	$74.43nxx	$0.1668ss	$0.2337ss
Baltimore	23.80	34.60	0.95	1.15	1.15	1.15	1.55	0.462	0.451r	63.00	71.25	0.16	0.2288
Birmingham	37.00ss	43.00ss	1.55ss	1.55ss	1.60lss	1.27ss	1.27lss	0.458dM	9.62K	67.34K	76.09K	0.16ss	0.23ss
Boston	22.00	30.00	1.40	1.40	1.40	1.45ss	1.50ss	0.462	29.35p	64.42dd*xx	71 92dd	0 1668ss	0.2337ss
Chicago	26.80tt	36.80tt	1.55	1.60	1.60l	1.60	1.60	0.506ss	10 294s	64 15ss	72 40ss	0.1762	0.2464
Cincinnati	23.85*ss	23.85*	1.75*ss	1.75*ss	1.75*ss	1.85ss	1.90ss	0.434	9.59	65.30xx	74.05xx	0.1668ss	0.2337ss
Cleveland	28.00N	45.00N	1.13ss	1.16ss	1.24lss	1.45ss	1.45ss	0.458ss	8 48	64.33ccxx	72.58ccxx	0.1633tt	0.2288tt
Dallas	30.65	32.65	1.07	1.23	1.37	1 21	1.32	0 484	0 517r	65 00	78.00	0 1668	0.1986
Denver	27.00	27.00	1.50	1.40	1.50	1.50ss	1.60ss	0 452	10 80	65 00gg	73.57gg	0 1668	0.2337
Detroit	28.00ss	28.00ss	1.27ss	1.31ss	1.40ss	1.45ktt	1.50ktt	0 452a	10 19r	65 15zzx*	73 90zzx*	0 1668	0.2337
Kansas City	30.00	35.00	1.19E	1.21E	1.29lE	1.21	....	0.444	23.20ggvv	67.50E	76.25E	0.1672	0.2464
Los Angeles	27.00tt	28.00tt	1.25ktt	1.20ktt	1.25tt	1.06	1.10	0 486	10 543	65.02	73.27	0.1688	0.2288
Minneapolis	35.00F	35.00F	1.65tt	1.80F	1.95F	1.40S	1.40S	0 468	16 23	61.61GR	69.61fG	0.1762f	0.2067
Montreal	27.60A	35.60A	1.25A	1.40A	1.50A	1.15v	43.95A/l	12.10H	64.75H	.....	0.1840	0.2187
New Orleans	34.00	48.00	1.25P	1.35P	1.25P	1.25P	1.25P	0.526	24 90	71.50	72.45	0.1762	0.2464
New York	26.00	35.00	1.35	1.30	1.50	1.40	1.40	0.462rd	9.29a	65.00aB	73.75aB	0.1633	0.2288
Philadelphia	26.50	31.00ss	1.30ss	1.30ss	1.40lss	1.25ss	1.25qqss	0.44	9.46	63.00	71.25	.16/.18	.22/.24
Pittsburgh *	30.00nn	33.00nn	1.50nn	1.50nn	1.50mm	1 50nn	1 50nn	0.452	9.46	64.00	76.25pp	0.1555	0.1848
St. Louis uu	30.00uu	41.00uu	1.50uu	1 60uu	1.55uu	1.60uu	1.65uu	0.452	10.28	65.39Kmm	71.89yuu	0.1634fmss	0.1944fmss
San Francisco	29.50ss	30.50ss	1.38ss	1.38ss	1 50ss	1.38ooss	1.58ooss	0.502	9.76	66.50K	74.25K	0 1762	0 2464
Seattle	42.40nn	45.60nn	1.55nn	1.25knn	1.85knn	1.50k	....	0.513D	9.90D	65.02D	72 27D	0.1668	0 1752
Toronto	30.40	50.00	1.45	1.45	1.65	45.00Q	....	0.3995	24.75ap	73.74	86 52	0.2917	0 3265

‡trucklots, delivered †fob warehouse *fob city *a delivered *b ½" O.D. *c ⅝" O.D. *d 0.100"th *e 34" x 60" sheet *f per 100 ft *g 5 tons & up; cold roll, anneal & pickled 2B finish *h Incl. Federal tax *i add 25¢ for pint of additive *j 1100 & 3003 alloy, mill finish *k bag of 3 cu ft *l treated with air entraining agent *m 2-10M ft *n fob mill fr equalized with nearest stocking competitor *o 250 sacks or more *p 100 sq ft *r per lb *s 30 lb bag *t 36" x 108":–10.81 lb/sh; 48" x 144": 21.7 lb/sh *u 19.31 lb/sh *v fob plant *w 48" x 144" *x 0.11"th *y 27 gauge *aa 16M lb & up *dd add $1.00 cwt boxing *ee 4 tons & up *gg add $2/cwt boxing; $0.75 cwt on skids *hh Theoretical wt for 48" x 96": 60.4-lb. per sh *ii 300-bag lots *jj 100-lb bag *mm Theoretical wt; 19.7-lb per sh *nn 2% cash *oo skid packed *pp type 304 *qq Philadelphia and suburbs. *rr less 2% disc. 15 days. *ss less 2% disc. 10 days. *tt less 2% disc. 10th. *uu add 2% sales tax. *vv Type N. *ww Per 100 sf. *xx less ½% disc. 10 days. *yy .021 ga. *zz .061" th. *A Per 100 lb. *B crated. *C 15M lb. *D less ½ % for cash. *E Quantity differential. *F less 5% disc. 10th. *G less ½% disc. 10th. *H Fed. tax exempt. *K less ½%. 10 days. *L 5% disc. 30 days. *M 3003; .052 for 1100. *N less 2% 10th mo. *O less $2, cash & carry. *P less 2% 15 days. *Q per ton. *S add .10/bag under 200 bags. * Philadelphia prices revised, watch for analysis

Bids Asked—Low Bidders—Contracts Awarded—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager J. A. MAHONEY, M. WETZEL, M. E. SCIORRA, D. TARTAGLIA, MARIE MORAVSIK, ELAINE CHOMYAK, ELIZABETH WERRA, ELEANOR QUERET, Reports, J. H. WEBBER, E. R. HUBER, Statistics.

NEW ENGLAND

BUILDINGS—BA

▲ **Conn., New London**—OFFICE, etc.—BA 9/3—Southern New England Telephone Co., 227 Church St., New Haven, 5 story, 50,000 sq. ft., concrete, brick, block office and operations bldg., dial sys., Washington St., $2,100,000. Douglas Orr, 111 Whitney Ave., New Haven, archt. CD 10/14.

▲ **N. H., Manchester**—SCHOOL—BA 9/3—City, 88 Lowell St., high school, S. Porter St. and Webster Rd. $2,500,000. Plans deposit $150. Dirsa & Lampron, 922 Elm St., assoc. archts. Koehler & Isaak, 1880 Elm St., archts. J. U. Wiesendanger, East Winthrop, Me., engr. CD 10/6.

HEAVY CONSTRUCTION—LB & CA

▲ **VERMONT**—State Dpt. Hys., State House, Montpelier, Bids opened 8/14,

Perini Corp., 73 Montwaite Ave., Framingham, Mass. LB $4,924,764, est. $5,000,000, grade, subbase, b. conc., surf. course, two 4 span composite WF beam bridges, Rte. 91, Proj. 1-91-1 (9) Brattleboro, Summerstown and Putney. CD 7/24.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

▲† **Pennsylvania and New Jersey**—BA About 9/16—U. S. Eng., 2635 Abbottsford Rd., Phila., Pa., dredging approx. 5,119,000 cu. yd. Delaware River between Phila., Phila. Co., Pa. and Trenton, Mercer Co., N. J. $5,000,000. CD 9/19.

BUILDINGS—BA

▲ **N. Y., New York**—APARTMENT—Bids Asked—Lenox Hill Neighborhood Assn., 331 E. 70th St., 296-family middle income cooperative apartment, Yorkville Section, east side York Ave. between East 81st and East 82nd Sts. $4,400,000. Brown & Gunther, 1860 Broadway, New York, N. Y., archts.

HEAVY CONSTRUCTION—LB & CA

▲ **Zara Contr. Co., Inc.**, Engel St., Hicksville, N. Y., CA $4,228,470, Contr. No. 10002-2-ELM-4A, lateral sewers, Lakeview and West Hempstead, Sewage Collection Dist. No. 2-ELM, MINEOLA, N. Y. Dpt. P. Wks., Nassau Co., Old County Courthouse, Mineola, N. Y. Bids July 28. CD 7/30, under LB.

BUILDINGS—LB & CA

▲ **John W. Ryan Constr. Corp.**, 11 W. 42 St., New York, N. Y., CA $3,000,000, 5 DORMITORIES AND SOCIAL FACILITIES, PRINCETON, N. J. Princeton University, Princeton, N. J. Bids July 28. CD 7/21.

▲ **Wark & Co.**, 1920 Sansom St., Phila., Pa., CA $2,000,000, RESEARCH and ENGINEERING CENTER, EXTON, PA. Foote Mineral Co., 18 W. Chelten Ave., Exton, Pa. Bids July 22. CD 7/17.

▲ **Lindy Bros. Builders, Inc.**, 5343 Greene St., Phila., Pa., Separate Contracts, $7,200,000, RESIDENTIAL DEVELOPMENT (600) Knights Rd., etc., PHILA., PA. Theodore Brandow, Erdenheim, Pa., and S. Sherwin Rochlis, 1325 Walnut St., Phila., Pa., archts.

SOUTH

HEAVY CONSTRUCTION—LB & CA

▲† **Kaiser Steel Corp.**, 612 S. Flower St., Los Angeles, Calif., CA $3,898,999, 305 ft. self-propelled tower for Saturn Missile, with shops, controls, elevators and testing equipment, Cape Canaveral, Patrick Air Force Base, COCOA, FLA. U. S. Eng., 575 Riverside Ave., Jacksonville, Fla. Maurice H. Connell & Assocs., P.O. Box 3526, Riverside Station, Miami, Fla., archts.-engrs. (Correction—cost). CD 8/6, under CA.

▲† **English Electric**, Netherton, England, LB $1,590,665, Item 1, **Baldwin-Lima-Hamilton**, Chester Pike and Simpson St., Eddystone, Pa., LB $1,564,000 Item 1 (with liquidated damages provision) $1,438,000 (without liquidated damages provision) two 48,300 hp. turbines and 32,400 kw generators for installation in Wheeler Dam for operation in summer of 1962, ALABAMA, Tennessee Valley Auth., New Sprankles Bldg., Knoxville, Tenn. Bids July 30. CD 7/20.

English Electric, Netherton, England, LB $2,354,305, Item 2, **Baldwin-Lima-Hamilton**, Chester Pike and Simpson St., Eddystone, Pa., LB $2,313,000, Item 2 (with liquidated damages provision) and $2,140,000 (without) three turbines (Alabama);

American Elin Corp., Weiz, Austria, LB $1,436,000, Item 3, **General Electric Co.**, 1 River Rd., Schenectady, N. Y., LB $1,760,300, Item 3, two 32,400 kw. generators (Alabama);

American Elin Corp., Weiz, Austria, LB $2,133,000 Item 4, **General Electric Co.**, 1 River Rd., Schenectady, N. Y., LB $2,627,400, Item 4, three generators (Alabama).

English Electric, Netherton, England, LB $3,415,334, Item 5, two turbines and two generators (Alabama); **English Electric**, Netherton, England, LB $5,025,315, Item 6, three turbines and three generators (Alabama).

BUILDINGS—LB & CA

▲† **General Electric Co.**, 1 River Rd., Schenectady, N. Y., CA $18,007,280, 600 KW Tandem-compound steam turbogenerator for new plant Western Tennessee, TENNESSEE. Tennessee Valley Auth., New Sprankles Bldg., Knoxville, Tenn. Bids June 16. CD 6/18, under LB;

Brown, Boveri Corp., Baden, Switzerland, CA $8,500,000; Sched. I, Item 2, one 500 KW cross compound steel turbogenerator and 2 boiler feed pump turbines for operation Aug. 1, 1963 for existing plant (Tennessee).

MIDDLE WEST

HEAVY CONSTRUCTION—BA

▲ **Ind., Fort Wayne**—BA 9/15—Bd. P. Wks., 1 story, bsmnt., steel, rein.-con. sewage treatment plant addn., incl. primary, aeration and final tanks, digesters. $3,700,000. Plans deposit $90. Consoer-Townsend & Assoc., 360 E. Grand Ave., Chicago, Ill., engrs. CD 8/29/57.

BUILDINGS—BA

▲ **Ind., Goshen**—SCHOOL—BA 9/21—Goshen School Bldg. Corp., 1 story, bsmnt., brick and block high school addn., incl. 2 swimming pools and gymnasium. $2,000,000. Bevington-Taggert & Fowler, K of P Bldg., Indianapolis, engrs. Maurer & Maurer, Lafayette Bldg., South Bend, archts.

HEAVY CONSTRUCTION—LB & CA

▲ **Builders Lighting Corp.**, 4653-59 W Arthington St., Chicago, Ill., CA $2,361,115, Section 83-cs, street lighting, CICERO, ILL. City of Cicero, City Hall Cicero, Ill. Bids July 6, awarded Aug. 1. CD 7/30, under LB.

BUILDINGS—LB & CA

▲ **Joseph T. Carp**, 5640 N. Northwest Hy., Chicago, Ill., CA Est. $3,000,000, MFG. and WAREHOUSE FACILITY, OFFICE, CAFETERIA and parking area, WILMINGTON, ILL. Personal Products Corp., sub. Johnson & Johnson, 6401 W. 65th St., Chicago, Ill. CD 7/30.

▲ **Salem-Brosius, Inc.**, 12 Arch St., Carnegie, Pa., CA Total cost $35,000,000, roll-down type tube REHEATING FURNACE and battery of soaking pits at River Rouge Plant, DEARBORN, MICH. Ford Motor Co., The American Rd., Dearborn, Mich. CD 3/10.

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $53,000, other public works $88,000, industrial buildings $110,000; other buildings $400,000. Also Foreign projects of $1,000,000 and more in size of interest to American contractors.

By Regions & Classes of Construction
(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED
New England — **Middle West**
Middle Atlantic — **Mississippi to Rockies**
South — **Far West**
PROPOSED WORK
Water Supply — **Public Buildings**
Sewers, Waste Disposal — **Mass Housing**
Bridges — **Commercial Buildings**
Streets & Roads — **Industrial Buildings**
Earthwork, Waterways — **Unclassified**

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.

BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.

SOON LETS CONTRACT: SLC

LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily issue in which last previous report was published.

OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

† Federal Government
▲ Project of $1,000,000 or over
ENR Engineering News-Record
CD Construction Daily

For additional reports see Construction Daily.

MISSISSIPPI TO ROCKIES

HEAVY CONSTRUCTION—BA

▲† **Texas**—BA 9/10—U. S. Eng., foot of Prytania St., New Orleans, La., Part I channels, levees, downstream from Cooper Reservoir, Sulphur River, ENG-16-047-60-28B. Over $2,000,000. CD 9/23.

BUILDINGS—BA

▲† **Tex., Houston**—FEDERAL COURTHOUSE and OFFICE—BA 9/10—General Services Admin., 1114 Commerce St., Dallas, 12 story, 521,071 sq. ft. Federal Courthouse and Office, Rusk, Brazos, Capitol and Smith Sts. $12,000,000-$17,000,000. Extended date. Staub, Rather & Howze, 2814 Virginia St., Jno. F. Staub, 2814 Virginia St., Harvin C. Moore, 2006 W. Alabama St., Rustay & Martin, 1811 Crawford St., archts. H. E. Bovay, Jr., 5009 Caroline St., Walter P. Moore, 2 Pinedale St., engrs. CD 8/13.

HEAVY CONSTRUCTION—LB & CA

▲† **Guy F. Atkinson Co.** & Ostrander Constr. Co., 10 West Orange Ave., South San Francisco, Calif., CA $19,367,462, powerhouse superstructures and surge tank bases, Oahe Reservoir Proj. near Pierre, ENG-25-066-59-127, SOUTH DAKOTA. U. S. Eng., 1709 Jackson St., Omaha 2, Neb. Bids July 30, awarded Aug. 14. CD 8/3, under LB.

FAR WEST

HEAVY CONSTRUCTION—LB & CA

▲ **N. S. Shumway Constr. Co., Inc.**, 1702 W. Fillmore St., Phoenix, Ariz., CA $2,698,274, South Feeder Water Main from Thomas and 64th St. to 9th St. and Polk area, PHOENIX, ARIZ. City, City Hall, Phoenix, Ariz. Bids Aug. 4, awarded Aug. 12. CD 8/10, under LB.

▲† **Montgomery Ross Fisher Co., Inc. & L. M. Halper & Co.**, 10835 Santa Monica Blvd., Los Angeles, Calif., CA $2,456,472, BOMARC IM-99B facility, Vandenberg Air Force Base, ENG-04-353-59-104, LOMPOC, CALIF. U. S. Eng. 751 S. Figueroa St., Los Angeles, Calif. Bids July 28. CD 8/3, under LB.

▲ **Foster-Marsch Corp.**, 3911 Pacific Hy., San Diego, Calif., CA $6,212,044, Second San Diego Aqueduct, prestressed pipe alt., from La Mesa and Lower Otay Reservoir, SAN DIEGO, CALIF. San Diego County Water Auth., 2750 4th Ave., San Diego, Calif. Bids May 8. (Correction—contractors name). CD 6/30, under CA.

CANADA

HEAVY CONSTRUCTION—LB & CA

▲ **Tallman Constr. Co. Ltd. & Terminal Constr. Div. of Henry J. Kaiser Co. Canada Ltd.**, c/o 600 Panet St., Winnipeg, Man., CA $1,932,560, lengthening two runways and taxiways, International Airport, WINNIPEG, MAN. Awarded Aug. 3. CD 5/3/57.

BUILDINGS—LB & CA

▲ **Perini Quebec, Inc.**, 550 Sherbrooke St. W., Montreal, Que., CA 42 story, structural steel, glass walled OFFICE, Windsor Plaza, MONTREAL, QUE. Dorchester Commerce Realty Ltd., c/o Maxwell Cummings & Sons, 1390 Sherbrooke St. W., Montreal, Que. Bids June 2, awarded Aug. 11. CD 5/21.

LATIN AMERICA

HEAVY CONSTRUCTION—BA

▲ **Peru**—RUNWAY—BA 9/21—Commercial Aviation & Airports Corp., Govt. of Peru, Lima, runway for jet planes at new airport. $3,065,509. CD 4/2.

AMERICANS ABROAD

HEAVY CONSTRUCTION—BA

▲ **Thailand**—Bids in October—Royal Irrigation Dpt. of Kingdom of Thailand, Bangkok, furnishing, del. following goods, equipment and materials either f.o.b. contractors shipping point of cif, Bangkok Wharf, Thailand for the Bhumiphol Dam and Power Plant, Yanhee Multipurpose Proj., furnishing nine 3.54 meter by 4.62 meter draft tube bulkhead gates and 24 sets draft tube gate frames and guides, the gate frames are to be fabricated of stainless clad plates, Inv. YS-2-10; furnishing two 2.136 meter (84 in.) free discharge valves, complete with operating mechanism and appurtenant accessories to operate under maximum static head of 120 meters (393 ft.), the valves shall be of the hollow-cone or hollow-jet type, Inv. YS-2-11. Thai Liaison Engineer, c/o Engineering Consultants, Inc., 1940 West Mississippi Ave., Denver 23, Colo., U.S.A., engrs.; adv. ENR 8/27. CD 1/23/58

PROPOSED PROJECTS

WATER SUPPLY

▲ **Fla., Miami**—Arvida Corp., 314 John Ringling Blvd., WW, sewers, Southdale Subdivision, Southwest Section. $2,300,000. Gibbs & Hill, Inc., Penn Station, New York, N. Y., consult. engr.

▲ **Mass., Brockton**—City, City Hall, 30 in. conduit between Furnace Point and Silver Lake, 21 mi. 24 in.

mains, pump at Silver Lake. $1,921,000. To go ahead in 1960.

▲ **N. C., Raleigh**—City, City Hall, voted $1,742,000 bonds Aug. 11 water supply system imprvs., and enlarging. CD 7/17.

▲ **Tex., Dallas**—City, City Hall, Lake June Reservoir. $1,000,000. CD 9/4/56.

▲ **Tex., Dallas**—City, City Hall, Fornez Reservoir East Fork of Trinity River for domestic supply. $27,400,000. Forrest & Cotton, Praetorian Bldg., consult. engrs. CD 2/17.

▲ **Tex., Garland**—City, City Hall, voted bonds Aug. 4, WW sys. imprvs. $1,175,000. CD 7/20.

▲ **Tex., Mineral Wells**—City, water facilities (P-Tex-3070). $1,400,000. Joe J. Rady, 511 Insurance Bldg., Fort Worth, consult. engr.

SEWERS, WASTE DISPOSAL

▲ **Calif., Carlsbad**—City, 2960 Pio Pico Dr., defeated bonds July 28, sewer imprvs, $1,200,000; storm drain imprvs., $155,000. CD 6/3.

▲ **Calif., Santa Monica**—City, City Hall, $1,500,000 bond election Sept. 15, sanitary sewer imprvs.

▲ **Ill., Aurora**—Aurora Sanitary Dist., P.O. Box 241, sewage disposal plant, auxiliaries, appurtenances, etc. $1,950,000.

▲ **Minn., St. Paul**—City, City Hall, storm water relief sewer St. Peter St.-Rondo Ave. $1,500,000. CD 11/9/53.

▲ **S. C., Greenwood**—City, City Hall, secondary sewage treatment plant, trunk sewers and pumping station. $2,000,000. Black & Veatch, 4706 Broadway, Kansas City, Mo., consult. engrs. (correction owner). CD 5/13.

▲ **Tex., Houston**—City, City Hall, bond election Sept. 12, storm sewers $10,000,000, sanitary sewers $7,000,000. CD 1/29/58.

▲ **Tex., Garland**—City, City Hall, voted bonds Aug. 4, sanitary sewer imprvs. incl. lines, collection sys. and disposal plant. $2,500,000. CD 7/20.

BRIDGES

▲ **NEBRASKA—IOWA**—State Dpt. Rds. & Irrigation, Lincoln, Neb. and State Hy. Dpt., Ames, Iowa, **Douglas Co., Neb**—Interstate Hy. Bridge over Missouri River between Omaha and Council Bluffs. $11,000,000. Leo A. Daly, 633 Ins. Bldg., Omaha, Neb., archt., and Howard-Needles-Tammen & Bergendoff, 1805 Grand St., Kansas City, Mo., consult. engrs. CD 9/12/56.

▲ **O., Jefferson** — Comrs. Ashtabula Co., Court House, 2-mill bridge levy to be voted Nov. 3, bridges, $1,500,000. Will run three years and raise $500,000 per year. CD 7/30.

▲ **Tex., Houston**—City, City Hall, bond election Sept. 12, grade separations $4,000,000; bridges $3,000,000. CD 1/29/58.

STREETS AND ROADS

▲ **HAWAII**—Dpt. Public Rds., 721 Keliko, Honolulu, **Honolulu**—0.5 mi. 6 lanes Lunalilio Freeway, Middle St. to Pinkahm St., Proj. F 072-1 (2), $1,475,000.
0.7 mi. 4 lanes, Middle St., Unit 3, Proj. F-065-1 (1), $1,168,700.
0.2 mi. 2 lanes, Lunalilo Freeway, Keaumoku St. separation, Proj. U-072-1 (8), $721,340.
0.2 mi. 4 lanes, Moanulua Rd., Unit 3, Proj. US-S-0720 (3), $750,000.

▲ **HAWAII**—Dpt. Public Rds., 721 Keliko, Honolulu, **Honolulu**—1.0 mi. 4 lanes Pali Hy.-Coelho Lane to Kaykine St. Proj. BU 061-1 (7). $4,860,000.

▲ **Tex., Garland**—City, City Hall, voted bonds Aug. 4, street imprvs. $2,691,000. CD 7/20.

▲ **Tex., Houston**—City, City Hall, bond election Sept. 12, permanent streets paving $5,650,000, streets topping $3,000,000. CD 1/29/58.

EARTHWORK, WATERWAYS

▲ **Pennsylvania**—Pennsylvania Power & Light Co., PP&L Bldg., Allentown, reconstr. and raising dam at hydro-electric plant, Holtwood. $9,000,000.

AIRPORTS

▲ **La., Monroe**—AIRPORT IMPRVS., etc.—City, City Hall, airport imprvs., terminal bldg., Selman Field. $1,000,000. Rader & Assocs., 1st Natl. Bank Bldg., 100 Biscayne Blvd., Miami 32, Fla., engrs.

▲ **Tex., Houston** — AIRPORT — City, City Hall, bond election Sept. 12, airport. $6,000,000. CD 1/29/58.

AMERICANS ABROAD

▲ **AFGHANISTAN**—Royal Govt. of Afghanistan, Kabul, approx. 400 mi. hy. from Kabul to Kandahar. $20,000,000.-$30,000,000. Ken R. White, 1567 Marion St., Denver, Colo., U.S.A., consult. engrs.

▲ **France, Amiens**—PLANT—Goodyear International Corp., 120 Broadway, New York, N. Y., U.S.A., tire and tube plant. $7,000,000.

PUBLIC BUILDINGS

▲† **Ark., Blytheville**—HOUSING—Base Procurement Office, Blytheville Air Force Base, plans by Swain & Allen, Gazette Bldg., Little Rock, 470 Capehart family housing units and utilities. $7,000,000. CD 4/27.

▲ **Calif., Davis**—PHYSICAL SCIENCES—University of California, Davis, plans by Barovetto & Thomas, 718 Alhambra St., Sacramento, 3 story rein.-con. physical science bldg. $1,000,000. CD 8/7.

▲ **Calif., Martinez** — LIBRARY, etc. — Contra Costa County, Courthouse, plans by Corlett & Spackman, 347 Clay St., San Francisco, central library and county office, Pleasant Hill. $1,286,570.

▲ **Colo., Aurora**—HOSPITAL—Aurora General Hospital Assoc., 719 Scranton, 100 bed hospital. Formation of Hospital Dist. to be voted Nov. 3 election. $2,000,000.

▲ **Conn., Bethel**—SCHOOLS—Town, Town Hall, Junior High School, $1,200,000; elementary school, Codfish Hill Rd., $500,000.

▲ **Fla., Arcadia**—PRISON—Bd. Comrs. of State Institutions, Tallahassee, conversion of hospital to prison. $1,500,000. CD 3/13/58.

▲ **Ill., Chicago**—SCHOOL—Bd. Educ., 228 N. LaSalle St., plans by Raymond A. Peterson, 4014 W. Dempster St., Skokie, Calhoun School, 2850 W. Jackson Blvd. $1,060,000. CD 6/11/57.

▲ **Ind., Muncie**—ENGLISH, MUSIC, etc.—Ball State Teachers College, Admin. Bldg., plans by Walter Scholer & Assocs., 1114 State St., Lafayette, 2 story, brick, concrete block, stone, rein.-con. English, Music and Auditorium, Sec. 3, 4 and 5 (superstructure). $2,000,000.

▲ **Ky., Lexington**—PHYSICAL AND CHEMISTRY SCIENCE—Commonwealth of Ky., Div. Purchases, Frankfort, plans by Brock & Johnson, 159 Barr St., 3 story, bsmnt., brick, rein.-con physical and chemistry science bldg., University of Kentucky. $4,700,000. Staggs & Fisher, 508 E. Main St., consult. engrs.

▲ **La., Baton Rouge** — SCHOOL — East Baton Rouge Parish School Bd., 805 St. Louis St., plans by T. A. Brussard, 2491 Greenwood Dr., McKinley Junior High School. $1,900,000. E. E. Evans, 4755 Convention St., engrs. Bids in fall.

▲ **Mass., Webster**—SCHOOL—Town, School Bldg. Comm., Negus St., plans by Domian & Salk, 340 Main St., Worcester, Mass., Intermediate School near Athletic Field. $1,164,000. CD 7/15.

▲ **Mich., River Rouge**—CITY HALL, etc.—River Rogue Public Building Auth., City Hall, plans by Smith, Hinchman & Grylls Assoc., Inc., archts.-engrs., 3107 W. Grand Blvd., Detroit, Mich., city hall with circular glass chamber on 3rd fl., 2 story fire station and police headquarters, park. $2,935,000.

▲ **N. Y., Jericho**—SCHOOL—Bd. Educ. plans by Knappe & Johnson, 2110 Northern Blvd., Manhasset, South Parkway Elementary School, Cantiague Rock Rd. and Jackson Elementary School addn. $1,288,000. Fromme & Vosganian, 56 W. 45th St., New York, N. Y., structural engrs. CD 5/8.

▲ **N. Y., New York**—HOUSING—New York City Housing Auth., 299 Broadway, Zone 7, plans by Kiff, Colean, Voss & Souder, office of York & Sawyer, 101 Park Ave., Zone 17, Proj. NY-5-33, two 22 story and three 18 story James Madison Housing, Madison and Park Aves., E. 107th to 110th Sts. $8,000,000. Severud-Elstad-Krueger Assoc., 415 Lexington Ave., Zone 17, consult. engrs. Meyer Strong & Jones, Inc., 230 Park Ave., mechanical engrs. CD 2/28/58.

▲ **Pa., Ebensburg**—SCHOOL—Central Cambria Jt. School Dist., secondary school alterations. $1,000,000.

▲ **S. C., Greenville**—SCHOOLS—Greenville Co. Bd. Educ., Courthouse, plans by J. E. Sirrine Co., 219 Main St., Northside High School, $1,500,000; plans by R. H. Longstreet & Assocs., 426 N. Pleasantburg Dr., Happy Hearts Elementary School. $600,000.

▲ **Tex., Houston**—CITY HALL—City, City Hall, bond election Sept. 12, city hall addn. $2,000,000. CD 12/30/57.

▲ **Tex., Houston**—CIVIC CENTER—City, City Hall, bond election Sept. 12, Civic Center addn. $2,000,000. CD 1/29/58.

▲ **Tex., Kingsville**—HOSPITAL—Kleberg County, Courthouse, plans by Jessen, Jessen, Millhouse & Greeven, 2816 Hemphill Park, Austin; county hospital addn., remodeling. $1,200,000.

▲ **Vt., Brandon** — SCHOOL — Brandon-Pittsfield Union School Dist., Brandon, plans by Julian Goodrich, 930 Shelburne Rd., South Burlington, Otter Creek Union High School. $1,000,000. Constr. 1959-1960.

▲ **Ont., Kincardine**—NUCLEAR PLANT—Atomic Energy of Canada Ltd., Chalk River and Ontario Hydro-Electric Power Comn., 620 University Ave., Toronto, 200,000 kw. nuclear plant, Lake Huron. $60,000,000.

▲ **Ont., Owen Sound**—HOSPITAL—Ontario Mental Health Bd., Ontario Dpt. Health, Parliament Bldgs., Toronto, mental hospital, Meaford Rd. $6,000,000.

COMMERCIAL BUILDINGS

▲ **Calif., Livermore**—SHOPPING CENTER—Isador Schuman, c/o Goodwin B. Steinberg, archts., 141 1st St., Los Altos, shopping center. $2,500,000.

▲ **Calif., Sacramento**—HOTEL—Capitol Claremont Corp., Ashbury and Claremont Aves., Berkeley, plans by Frank F. Ehrenthal & Assocs., 251 Post St., San Francisco, 18 story, 350 room Capitol Claremont Hotel, Capitol Mall redevelopment area. $6,000,000. Constr. in 6 months.

▲ **Calif., Sacramento**—SHOPPING CENTER—Convenience Shopping, Inc., c/o Leo A. Daly & Assoc., archt., 49 Maiden Lane, San Francisco, shopping center, in Redevelopment area, constr. on platform with parking underneath. $1,200,000.

▲ **Calif., Santa Barbara**—YMCA—Y.M.C.A., Santa Barbara, plans by Arendt, Mosher & Grant, 116 E.

HARDWARE For HEAVY CONSTRUCTION

plant & main office: 9 Lister Avenue, Newark 5, New Jersey
N. J. N. Y.
MArket 3-0333 REctor 2-3958

WET JOB?
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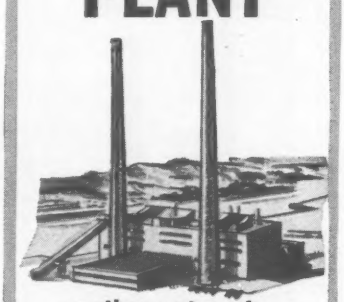

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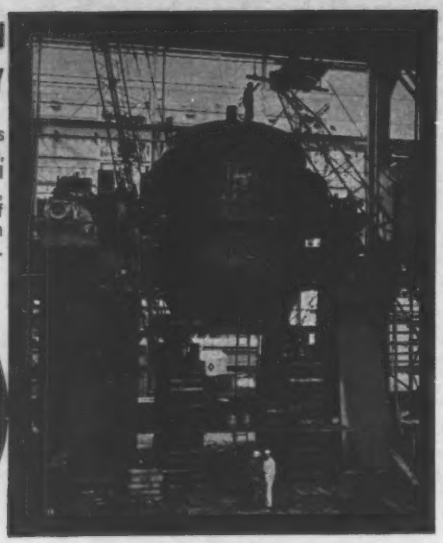

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Sola St., reinforced block, YMCA, State St. $1,000,000.

▲ **Fla., Palm Beach**—APARTMENTS—Mayel Enterprises, Winter Park, c/o James Gamble Rogers, Lovelock & Fritz, archts., 145 Lincoln Ave., Winter Park, 4 concrete, brick, steel apartment bldgs. $1,000,000.

▲ **Fla., Sanford**—SHOPPING CENTER—W. A. Knott & William J. Lane, c/o Florida Land Planning, Inc., 1921 E. Colonial Dr., Orlando, Mid-Florida Plaza Shopping Center, incl. 2,000,000 sq. ft. stores, parking and swimming pool, U. S. Hys. 17 and 92 and St. Rte. 436 near Sanford, Seminole Co. $20,000,000.

▲ **Hawaii, Honolulu**—OFFICE, etc.—Roy Kelley, 2168 Kalia Rd., 16 story office and stores, Seaside and Kalakaua Aves. $4,500,000.

▲ **Hawaii, Pokai Bay**—CO-OPERATIVE APARTMENTS, etc.—Vanatta Enterprises, 829 Alakea, Honolulu, "Second Waikiki", four co-operative apartments, restaurants and shops. $4,000,000.

▲ **La, Monroe**—SHOPPING CENTER, etc.—Gulf Inland Corp., c/o Saul Mintz, archt., 2930 Commerce St., 1 story, 100,000 sq. ft., brick shopping center, $1,300,000; paving shopping area and auto center, $100,000.

▲ **Mich., Monroe**—HOSPITAL—Mercy Hospital, Monroe, hospital addn. $2,360,000.

▲ **Mich., Monroe**—HOSPITAL—Monroe General Hospital, hospital, $2,001,484.

▲ **Mo., St. Louis**—OFFICES—Conduit Industrial Redevelopment Corp., c/o G. J. Nooney & Co., 611 Olive St., Zone 1, 3 story or taller each offices. Washington Ave. and Olive St., 3rd and 4th Sts. $1,000,000.

▲ **N. J., Berkeley Heights**—APARTMENT—Leon Adler, 118 Webster St., Irvington, 320 unit garden apartment at Briarwood and Springfield Ave. $1,000,000.

▲ **N. J., Glen Gardner**—HOUSES—George Blew, c/o Edward Changler, Rte. 69, Pattenburg, 41 houses, off Sodom Lane, $1,000,000.

▲ **N. J., Lebanon**—HOUSES—Emil Gottlieb, R.D., Lebanon, 128 houses, Bissel Rd. $1,000,000.

▲ **N. J., Woodbridge**—DEPARTMENT STORE—Henry I. Chanin, 122 E. 42 St., New York 17, N. Y., plans by I. S. Chanin, 122 E. 42 St., New York 17, N. Y., 1 and 2 story, glass and steel department store on 44-acre tract, Rte. 1, bounded by Ford Ave. and Garden State Parkway. $5,000,000. S. Klein, lessee. CD 4/13.

▲ **N. Y., Amherst**—HOMES—Juette Builders, 20 Coronation Dr., Amherst, 129 homes, Hartford Estates addn. $3,000,000.

▲ **N. C., Durham**—APARTMENT—Poplar Apartments, Inc., Erwin Rd., plans by Louis H. Asbury & Assocs., 121 Brevard Court, Charlotte, 200 unit apartment addn. $1,500,000.

▲ **O., Toledo**—OFFICE—701 Jefferson Building Co., c/o Morris Gillette, 320 Michigan Ave., plans by Bellman, Gillette & Richards, 1600 Madison St., 8 story office, $1,000,000. Ohio Fuel Gas Co., lessee.

▲ **Pa., Phila.**—HOSPITAL—Pennsylvania Hospital, 8th and Spruce Sts., 8 story air-conditioned hospital. $3,700,000.

▲ **Tex., Beaumont**—CHURCH—First Baptist Church, 848 Broadway, plans by Ingram & Harris, 1125 Freeway North, church. $1,250,000. CD 8/10.

▲ **Tex., Houston**—OFFICE—Humble Oil & Refining Co., 1216 Main St., plans by Welton Becket & Assocs., 2225 Bryan St., Dallas; Golemon & Rolfe, 5100 Travis St., Houston, and Pierce & Pierce, 2200 Welch St., Houston, 44 story office. $32,000,000. Bids Spring 1960. CD 10/7.

▲ **Que., St. Eustache**—SHOPPING CENTRE—Les Enterprises du Domaine Ltee c/o B. A. Corbo, 49 rue Labrie, plans by Thibodeau & Thibodeau, 940 Cote de Liesse, Montreal, shopping centre, Hy. 8 at northwest city limits, $1,000,000.

INDUSTRIAL BUILDINGS

▲ **Ark., Stuttgart**—PLANT—Arkansas Grain Corp., soybean oil extraction plant. $1,500,000.

▲ **Tenn., Kingsport**—PLANT—American Saint-Gobain Corp., 25 Madison Ave., New York, N. Y., 330 tons per day plate glass production plant. $50,000,000.

▲ **Tex., Dallas**—MOTOR FREIGHT—Red Ball Motor Freight Inc., 1210 S. Lamar St., plans by Geo. L. Dehl, archt.-consult. engr., 2101 N. St. Paul St., motor freight $1,250,000.

▲ **Utah, Garfield**—SMELTING PLANT—Kennecott Copper Corp., Utah Copper Div., Kearns Bldg., Salt Lake City, altering smelting plant. $10,000,000. Western Knapp Engineering Co., 650-5th St., San Francisco, Calif., consult. engr. CD 3/4.

▲ **W. Va., Fairmont**—ALUMINUM ROLLING MILL—Fairmont Aluminum Co., P.O. Box 912 (sub. Cerro de Pasco Corp., 300 Park Ave., New York, N. Y.), aluminum rolling mill addn. $10,000,000.

UNCLASSIFIED

▲ **Hawaii, Honolulu**—ARENA—City and Honolulu County, City Hall, plans by Merrill, Simms & Roehrig, Damon Bldg., 400 ft. arena with vaulted concrete roof. $5,500,000.

▲ **Tex., Dallas and Fort Worth**—STADIUM—Dallas County and Fort Worth County, County Comrs. Court, Dpt. Public Parks, stadium for major league baseball between Dallas and Fort Worth. $1,000,000.

▲ **Tex., Houston**—PARKS, etc.—City, City Hall, bond election Sept. 12, parks, recreation, playgrounds. $4,000,000. CD 1/29/58.

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Ask the operator on any job why he likes his Clyde and he'll tell you feature by feature.

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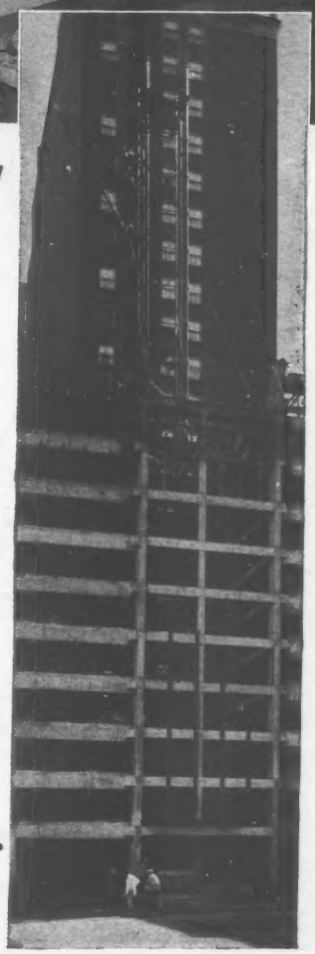

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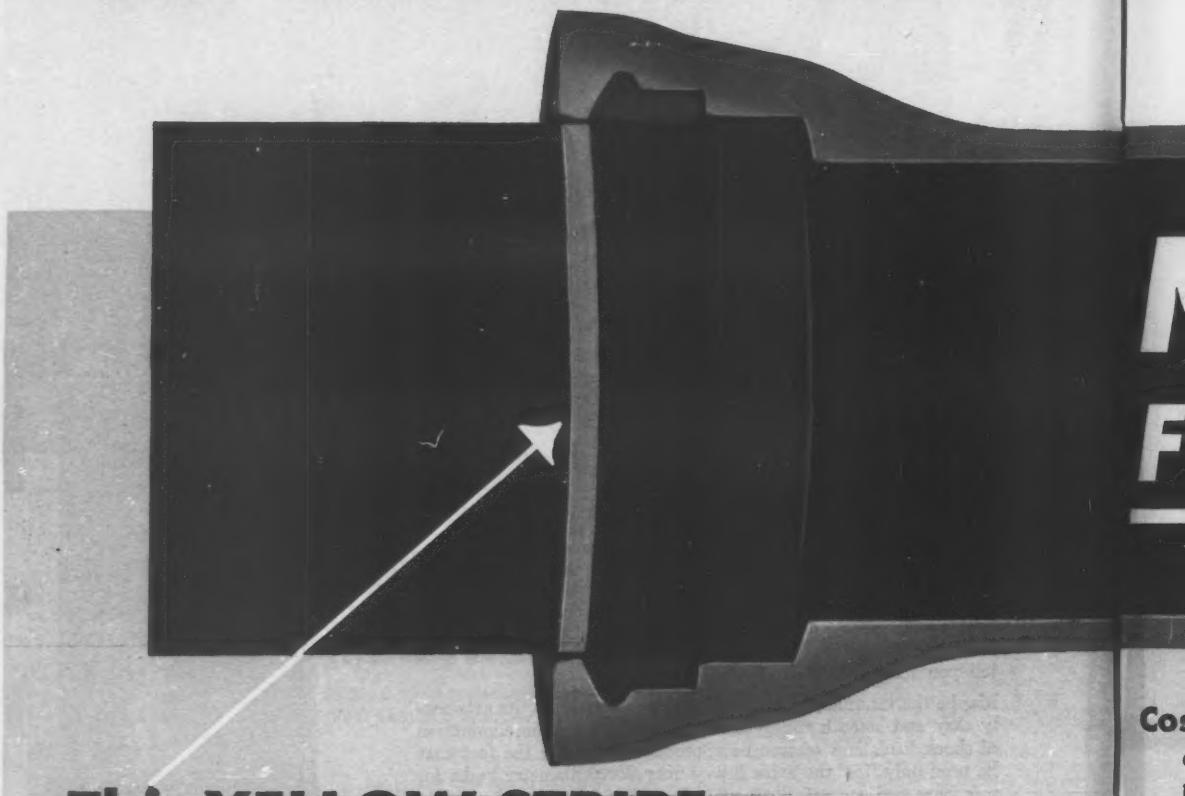

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is your guide line to a quick bottle-tight seal

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NEW ENGLAND

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

August 31, September 8 Connecticut

STREETS AND ROADS

August 31, September 8 Connecticut

▲† New Hampshire—BA On Or About 11/1—U. S. Eng., 562 Congress St., Portland, Me., Everett Dam, Hopkinton Dam, Canal No. 2, and appurtenant structures and Winslow Road relocation-Hopkinton-Everett Reservoir, Contoocook and Piscataquog Rivers, ENG-19-016-60-1. $10,000,000-$15,000,000. CD 9/23.

HEAVY CONSTRUCTION—LB & CA

▲ NEW HAMPSHIRE—Dpt. P. Wks. & Hys., Concord, J. F. Fitzgerald Constr. Co., 1000 Turnpike St., Canton, Mass., CA $1,576,617, b. conc. 2.60 mi. and 185 ft. and 165 ft. steel beam bridges, Northfield, Merrimac Co. Bids July 23. CD 7/29, under LB.

▲ NEW HAMPSHIRE—Dpt. P. Wks. & Hys., Concord, Manchester Sand Gravel & Cement Co., Inc., P.O. Box 536, Manchester, N. H., CA $1,801,792, hot. b. conc. roadway 3.85 mi. (4 lane divided) and 332 ft. steel beam bridge, Canterbury and Northfield, Merrimac Co. Bids July 9, awarded July 31. CD 7/17, under LB.

▲ NEW HAMPSHIRE—Dpt. P. Wks. & Hys., Concord, J. F. White Contg. Co., Box 358, Westwood, Mass., CA $1,431,650, hot b. conc. roadway 52 ft., 49 ft., and 64 ft. steel beam bridges, Hopkinton, Merrimack Co. CD 7/2, under LB.

▲ Construction Service Co., Inc., P.O. Box 311, Bound Brook, N. J., CA $1,992,733, est. $2,000,000, Contr. 252, distribution water lines from Shaft 9A, city tunnel, Malden and Medford, MASSACHUSETTS. Commonwealth of Mass., Metropolitan Dist. Comm., Constr. Div., 20 Somerset St., Boston, Mass. Bids Aug. 11, awarded Aug. 14. CD 8/13, under LB.

BUILDINGS—LB & CA

▲ M. S. Kelliher Co., 10 Tremont St., Boston, Mass., LB $1,446,800, JUNIOR HIGH SCHOOL, WAKEFIELD, MASS. Town, Junior-Senior High School Bldg. Comm., 465 Main St., Wakefield, Mass. Bids Aug. 12. CD 7/20.

▲ John Zandonella, Inc., 70 Chase St., Bridgeport, Conn., LB $1,426,000 (8 bidders), two 4 story, 80,000 sq. ft. men's DORMITORIES, Proj. No. Conn. 6-CH 8 (D), BRIDGEPORT, CONN. University of Bridgeport, 200 Park Place, Bridgeport, Conn. Bids Aug. 11. CD 7/15.

▲ Schnier & Scholmberg, 18 Raymond Rd., West Hartford, Conn., Owner Builds, $2,196,430, 157 HOUSES, "Pleasant View Park", Center St., WINDSOR LOCKS, CONN. Roland Aubin, Pleasant Valley Rd., South Windsor, Conn., archt. CD 7/2.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

September 10 New York

BUILDINGS—BA

▲ Md., Riverdale—OFFICE—BA 9/2—Kiplinger Washington Editors, Inc., 1729 H N.W., Wash., D. C., office, south side East-West Hy., opposite Prince George's Plaza Shopping Center. $1,500,000. Bids July 14 rejected, LB $1,917,207. CD 7/20, under LB.

▲ Pa., Pottsville—NURSES HOME, etc.—BA 9/9—Pottsville Hospital, Pottsville, nurses home, incl. indoor pool, boiler room addn. Plans deposit $50. The Ballinger Co., 1625 Race St., Phila., Zone 3, archt. CD 7/9, under LB.

BUILDINGS—SLC

▲ Md., Suitland—SCHOOL—Archdiocese of Washington, 1721 Rhode Island Ave. N.W., Wash., D. C., soon lets contract girls' high school, known as LaReine School, 4900 Silver Hill Rd. for The Bernadine Sisters. $1,600,000. Philip Schreier, 1420 K St. N.W., Wash., D. C., archt. CD 8/7.

HEAVY CONSTRUCTION—LB & CA

▲ Emerson Garden Electric Co., Inc., 485 Lexington Ave., New York, N. Y., CA $2,802,576, 345 KV transmission line from Niagara Switchyard to Rochester Station, Niagara and Monroe Counties, No. PA 9-2 Contr. AL 2, NEW YORK. Power Authority of State of New York, The Coliseum Tower, 10 Columbus Circle, New York 19, N. Y. Bids July 21. CD 7/23, under LB.

▲† Al Johnson Constr. Co., 608 Feshay Terrace, Minneapolis, Minn., CA $5,004,780, dredging Delaware River between Phila., Pa. and Trenton, N. J. incl. removal, disposal of 900,000 cu. yds., PENNSYLVANIA AND NEW JERSEY. U. S. Eng., 2635 Abbottsford Rd., Phila., Pa. Bids July 23. CD 7/29, under LB.

BUILDINGS—LB & CA

▲ 341 East 34th St., Inc., 630 Third Ave., New York, N. Y., Owner Builds, $2,500,000, APARTMENT, 341-49 East 34th St., NEW YORK, N. Y. Leo Stillman, 332 E. 149th St., New York 51, N. Y., archt. CD 4/21.

▲ Stephen B. Palmer, Orange Bank Bldg., Orange, N. J., Owner Builds, $4,000,000, 145 HOUSES at University Hall, Franklin Twp., MIDDLEBUSH, N. J.

▲ Chanin Organization, 122 E. 42 St., New York 17, N. Y., Owner Builds, $5,000,000, 1 and 2 story, brick, steel, glass DEPARTMENT STORE, on 44 acre tract, Rte 1 and Ford Ave. to be occupied by S. Klein Dpt. Store, WOODBRIDGE, N. J. CD 8/11.

▲ Nason & Cullen, Inc., 65th and Vine Sts., Phila., Pa., CA $3,750,000, 3 story, 236 x 75 ft. brick, block, structural steel SCIENCE BLDG., VILLANOVA, PA. Villanova University, Villanova, Pa. Bids Aug. 4. CD 7/29.

▲ Piracci Constr. Co., 2552 Woodbrook Ave., Baltimore, Md., LB $2,667,900 (9 bidders), 2 story, brick, concrete, steel, block Linthicum JUNIOR-SENIOR HIGH SCHOOL, Linthicum Heights, ANNAPOLIS, MD. Bd. Educ. Anne Arundel Co., Annapolis, Md. Bids Aug. 11. CD 8/4.

▲ Coastal Constr. Co., c/o owner, CA Est. $1,306,000, 12 APARTMENT, 4700 Block Haldane Rd., 4700 Sinclair Lane, 5000 Block Conant Way, 5000 Block Lodgestone Way, 5000 Block Raintree Way, 4700 Block Parkside Garden Lane, BALTIMORE, MD Iberian Corp., 11 E. Fayette St., Baltimore 2, Md.

▲ John Tester & Son, Clinton, Md., LB $1,521,217 (4 bidders), Beltsville JUNIR HIGH SCHOOL, Beltsville, MARLBORO, MD. Prince George's County Bd Educ., Marlboro, Md. Walton & Maddon, 3510 Rhode Island Ave., Mt. Ranier, Md., archts. CD 8/1/58.

▲ Mullan Constr. Co., 3945 Greenmount Ave., Baltimore 18, Md., CA $3,000,000, 9 story, brick, concrete, steel block, terra cotta, air-conditioned, elevator APARTMENT, 11 Slade Ave., PIKESVILLE, MD. Eleven Slade, Inc., 216 E. Lexington St., Baltimore 2, Md. Daniel Schwartzman, 12 E. 36th St. New York, N. Y., archt. CD 12/18, under Owner, c/o Jos. J. Baylin, 216 E. Lexington Ave., Baltimore 2, Md., as owner.

▲ George Hyman Constr. Co., 1010 Vermont Ave. N. W., Wash., D. C., CA $2,365,000, ASPEN HIGH SCHOOL, Wheaton, ROCKVILLE, MD. Montgomery Co. Bd. Educ., Rockville, Md. Bids July 23. CD 7/27, under LB.

▲ Coe Constr. Co., Inc., 1018 Vermont Ave. N.W., Wash., D. C., CA Over $2,000,000, STORE, Wheaton Plaza Regional Shopping Center, for Montgomery Ward, WHEATON, MD. Wheaton Plaza Regional Shopping Center, Inc., 11160 Viers Mill Rd., Wheaton, Md. A. L. Anderson, 1726 M St. N.W., Wash., D. C., archt. CD 5/13.

▲† Norair Engineering Corp., 1118 22 St. N. W., Wash., D. C., LB $23,738,680 (13 bidders), MUSEUM of HISTORY and TECHNOLOGY, Smithsonion Institution, WASH., D. C. General Services Admin., 7 and D Sts. S. W., Wash., D. C Bids Aug 18. CD 8/4.

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

STREETS AND ROADS

September 4 Kentucky September 9 Virginia

HEAVY CONSTRUCTION—LB & CA

▲ G. E. Tillman, Inc., 702 North Locust St., Centralia, Ill., CA $2,837,700, sewage treatment plant imprvs., Contract "B", ATLANTA, GA. City Purchasing Agent, City Hall, Atlanta, Ga. Bids Aug. 12. CD 7/16.

▲ LOUISIANA—State Hy. Dpt., Rm. 307, Hy. Office Bldg., Baton Rouge,

Boh Brothers Constr. Co., 2400 Cypress St., New Orleans, La., CA $2,209,861, Bayou Des Allemands Bridge, Rte. LA-US 90, 0.494 mi. Proj. 5-08-20, Lafourche and St. Charles Parishes. Bids June 17, awarded July 15. CD 6/22, under LB.

BUILDINGS—LB & CA

▲ J. S. Stephens & Sons, 902 Roma Ave., Tampa, Fla., CA $1,527,726, LIBRARY CLASSROOM, University of South Florida, TAMPA, FLA. Florida State Bd. Control, University of South Florida, Courthouse, Tampa, Fla. Bids Aug. 5, awarded Aug. 14. CD 8/12, under LB.

▲ Cunningham-Limp, 3087 W. Grand Blvd., Detroit, Mich., CA Est. $1,500,000 (3 bidders), 1 story, 216,-000 sq. ft. concrete block, concrete slab PARTS WAREHOUSE adjacent to Assembly Plant, Grade Lane, LOUISVILLE, KY. Ford Motor Co., The American Rd., Dearborn, Mich. Bids Aug. 8, awarded Aug. 10. CD 7/29.

▲ Foster & Creighton, 1st American National Bank, Nashville, Tenn., CA $1,395,000, 155-unit MOTEL, Capitol Hill area, NASHVILLE, TENN. Capitol Park Corp., 410 Union St., Nashville, Tenn. CD 7/20, under LB.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

September 1 Indiana, Michigan

STREETS AND ROADS

September 2 Michigan September 8 Wisconsin

HEAVY CONSTRUCTION—LB & CA

▲ Witer-Gaddis Corp., 3326 W. 3 Ave., Gary, Ind., CA $1,680,575 (2 bidders), interceptor sewers, Glen Park Rd.; CA $684,289 (2 bidders), East Side interceptor sewers, S.E. from 5th and Rhode Island Aves., GARY, IND. City, City Hall, Gary, Ind. Bids July 8. CD 7/15, under LB.

▲ ILLINOIS—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldg., Springfield,

Ill.—Peter J. Crowley Co., P.O. Box 144, Maywood, Ill., CA $1,798,884, paving, walls 0.56 mi. Congress St. Expressway, Oak Park, Cook Co.;

Ill.—Zimmerly Constr. Co., Marshall St., Paris, Ill., CA $1,093,049, paving 1.9 mi. Lincoln Ave., Charleston, (FA 17), Coles Co.;

Ill.—H. H. Mass Constr. Co., Huntley Rd., Algonquin, Ill., CA $989,798, concrete base course 9.43 mi. FA 4 and 109 Rushville to Beardstown, Schuyler Co. Bids July 24, awarded 8/10. Grand total $3,881,691. CD 8/10, under LB.

▲ Kenny Constr. Co., 3220 Oakton St., Skokie, Ill. LB $1,599,681, est. $1,900,000, (8 bidders), No. 80.82-59-28, 113½ x 9 monolithic concrete and 60 in. concrete pipe Combined Union Ave. sewers, CHICAGO, ILL. Dpt. Purchases, City Hall, Chicago 2, Ill. Bids Aug. 18. CD 8/3.

▲ Malan Constr. Corp., 2 Park Ave., New York, N. Y. CA $5,387,000, American Airlines Hangar, O'Hare International Airport, Spec. 80.57-59-27, CHICAGO, ILL. Dpt. Purchases, City Hall, Chicago 2, Ill. Bids July 15. CD 7/17, under LB.

▲† Five Boro Constr. Co., 2 La Fayette St., New York, N. Y., LB $1,837,000 (3 bidders), 1 story, 40,000 sq. ft. hospital, Richard I. Bong Air Force Base, ENG-11-032-59-101, KANSASVILLE, WIS. U. S. Eng., 475 Merchandise Mart, Chicago 54, Ill. Bids Aug. 14. CD 8/3.

BUILDINGS—LB & CA

▲ Dahl-Stedman Co., 7 S. Dearborn St., Chicago, Ill. CA $1,300,000, 115x134 ft. BANK addn., CHICAGO, ILL. St. Paul Federal Savings & Loan Assn., 6720 W. North Ave., Chicago, Ill. Awarded Aug. 1. CD 6/19.

S. W. Robbins Constr. Co., 228 N. LaSalle St., Chicago 1, Ill., CA $2,500,000, 2 story, 257-unit MOTEL, pool, 5430 S. Cicero Ave. CHICAGO, ILL. Midway House, c/o Joel Robert Hillman, archt., 8 N. Ogden, Chicago, Ill.

▲ Miller, Davis & MacDonald, Inc., 1029 Portage St., Kalamazoo, Mich., LB $1,672,000 est. $1,622,000, STUDENT CENTER, Northern Michigan College, MARQUETTE, MICH. State Bldg. Dpt., Lewis Cass Bldg., Lansing, Mich. Ralph R. Calder & Assoc., 1212 Kales Bldg., Detroit 26, Mich., archts.

MISSISSIPPI TO ROCKIES

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

September 17 South Dakota

STREETS AND ROADS

September 17 South Dakota

▲† N. M., Los Alamos—PHERMEX FACILITIES—BA 10/6—Atomic Energy Comn., Los Alamos, Phermex Facilities, TA-15, incl. 12,800 sq. ft., bsmnt., laboratory-office 12,800 sq. ft. power control bldg., detection and phermex chambers, roads, parking areas, chilled water sys., gas, electric transformer stations, etc., Inv. No. 291-60-1. $1,500,000-$1,700,000. Extended date. CD 6/29.

BUILDINGS—BA

▲ Mont., Billings—PHYSICAL EDUCATION—BA 9/15 State Bd. Educ., Capitol Bldg., Helena, physical education bldg. Eastern Montana College of Education. $1,400,000. Plans deposit $50. Cushing, Terrell & Assocs., 1333 Airport Rd., archts. CD 9/24.

▲ Tex., Dallas—WESTERN TOWN—Bids Asked—City of Dallas (Park Bd.) and State Fair of Texas, c/o Fair Park Grounds and City Hall (selected list of bidders) Grand Ol' Texas Western Town: 84,491 sq. ft. main bldg., water, sanitary sewer lines, bridge, etc. $2,000,000. Peter Wolf & Assocs., Inc., 3800 Party St. (designed) archt., and Phillips, Proctor, Bowers & Assocs., 3851 Cedar Springs Rd., Dallas, planning consults. Hundley & Halff, 3851 Cedar Springs Rd., engrs. CD 11/22/57.

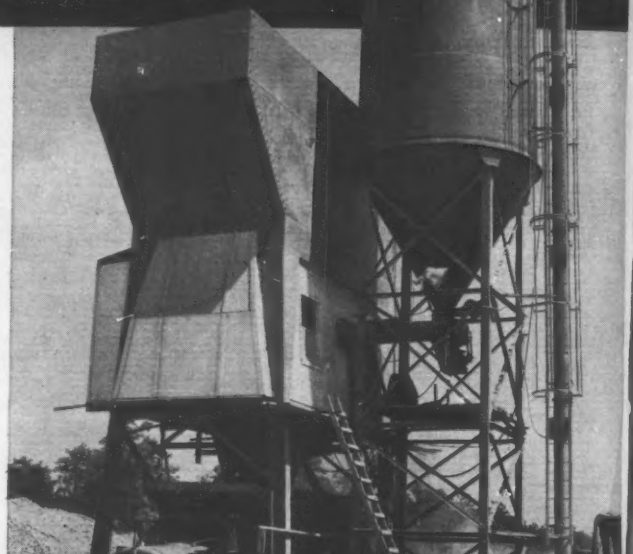
BUILDINGS—SLC

▲ Colo., Denver — RECREATION FACILITIES — Jewish Community Center, 1475 Williams, soon lets contract 1 and 2 story, 70,000 sq. ft. recreation facilities, E. Alameda between South Dahlia and South Elm Sts. $1,500,000. Nat S. Sachter, 4950 E. Evans Ave., archt. Robert M. Morris, 330 W. Asbury, assoc. engr. CD 6/23.

▲† Mo., St. Louis—HOTEL, etc.—Kingsman Investment Co., 108 N. Kingshighway, Zone 8, soon lets contract 2 story, ground floor, T-shaped, 53x239 ft. and 49x164 ft., 192-room Diplomat Hotel, incl. 67½x96 ft. public bldg. containing restaurant, meeting rooms, etc., southwest corner Kingshighway and Waterman Ave. $2,500,000. Hausner & Macsai, 104 S. Michigan Ave., Chicago, Ill., and Jos. R. Passoneau, Washington University, Skinker and Forsythe Blvds., St. Louis 5, Mo., archts. Paul Rogers & Assocs., 22 W. Madison St., Chicago, Ill., structural engrs. Paul Gawrusik & Assocs., 53 W. Jackson Blvd., Chicago, Ill., mechanical engrs. CD 6/8.

(Continued on page 69)

Mile-a-day highway paving record set with NOBLE 3B concrete batching plant



5,394 feet of highway paving setting a new 1-day record was supplied entirely by NOBLE 3B concrete batching plant. Two dual drum pavers pouring concrete every 30 seconds on relocation of Rhode Island Routes 2 and 3 depended on an uninterrupted flow of aggregates and cement. The 1150 batches required were batched and discharged by NOBLE 3B on schedule without a hitch! With overhead aggregate storage of 150 tons and separate overhead cement storage of 500 barrels, NOBLE 3B high speed output kept 8 dry batch trucks hauling materials in a steady stream to the paving site 7 miles away. Of all batching plants familiar to the contractor, **Campanella & Cardi,** in its ready-mix concrete division, NOBLE 3B was selected for highest productivity, consistent quality and reliable, economical operation.

NOBLE 3B

3 batchers (2 for aggregates, 1 for cement) weigh materials simultaneously for a *single* batch.

Batching quality concrete over twice as fast as conventional plants, NOBLE 3B keeps pace with fast-moving paving jobs. Sub-assembled at factory, it is transported rapidly to job site and quickly erected with no outside purchase of essential components or extensive field assembly and wiring. A pair of 3B plants set up as a dual twin-driveway *single-stop* plant for airfield construction when highest output is required can later be split into 2 complete plants for separate highway paving jobs in 1-stop or 2-stop set-ups controlled by a single operator.

NOBLE

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SEATTLE 9, WASHINGTON—518 First Ave., North, ATwater 4-4878
Export Distributor, Frazar International Corp., San Francisco
EL SEGUNDO (LOS ANGELES), CALIF.—218 Richmond St., { ORegon 8-6473 / EAstgate 2-4518

DISTRIBUTORS: BIRMINGHAM, ALA., Equipment Service Co., Inc. • PHOENIX, ARIZ., Western Machinery Co. • LOS ANGELES, CALIF., Smith-Booth-Usher Co. • DENVER, COLO., Western Machinery Co. • CHICAGO, ILL., Arrow Contractors Equipment Co. • INDIANAPOLIS, IND., Flesch-Miller Tractor Co. • DANVILLE, KY., Central Supply & Equip. Co., Inc. • BOSTON, MASS., Hedge & Mattheis Co. • DETROIT, MICH., R. G. Moeller Co. • ST. PAUL, MINN., Borchert-Ingersoll, Inc. • BILLINGS, MONT., Seitz Machinery Co. • ST. LOUIS, MO., George F. Smith Co. • OMAHA & NORTH PLATTE, NEB., Construction Service Equipment Co. • ALBUQUERQUE, N. MEX., Contractors Equipment & Supply Co. • SYRACUSE, N. Y., L. B. Smith, Inc. • STATESVILLE, N. C., Interstate Equipment Co., Inc. • CLEVELAND, OHIO, Wepco Equipment Co. • PORTLAND, ORE., Clyde Equipment Co. • HARRISBURG, PA., Highway Equipment & Supply Co. • PITTSBURGH, PA., Equipment & Supplies, Inc. • NASHVILLE, TENN., Peterson Machinery Co. • DALLAS, TEX., Lumby Machinery Co. • EL PASO, TEX., Border Machinery Co. • HOUSTON, TEX., Pearce Equipment Co. • SAN ANTONIO, TEX., Girard Machinery & Supply Co. • SALT LAKE CITY, UTAH, Arnold Machinery Co. • SEATTLE, WASH., Clyde Equipment Co. • SPOKANE, WASH., Western Machinery Co. • CASPER, WYO., Studer Tractor & Equipment Co., Inc. • CALGARY, ALB., Precision Machinery & Equipment, Ltd. • VANCOUVER, B. C., National Machinery Co., Ltd. • TORONTO, ONT., Crothers Mfg., Ltd. • MONTREAL, QUE., Laurentide Equipment Co., Ltd. • CINCINNATI, OHIO, The Bode-Finn Co. • WINNIPEG, MANITOBA, Prairie Equipment & Radiators Co., Ltd.

(Continued from page 67)

HEAVY CONSTRUCTION—LB & CA

▲ **Northern States Power Co.**, 15 South Fifth St., Minneapolis, Minn., Owner Builds, $1,590,000, natural gas pipe lines service, Stillwater, MINNESOTA.

▲† **Beacon Constr. Co.**, 100 Hano St., Boston, Mass., CA $1,858,219, est. $1,617,849, Sched. 1, Nike Hercules Facility, Offutt Air Force Base, ENG-25-066-59-126, FORT CROOK, NEB. U. S. Eng., 1709 Jackson St., Omaha 2, Neb. Bids June 23, awarded Aug. 14. CD 6/29, under LB.

▲ **KANSAS**—State Hy. Comn., Manhattan, Kan.—**Freeto Constr. Co., Inc.**, Box 609, Pittsburg, Kan., CA $879,634, substructure Bridge No. 16-81-2.2, Sta. 168 plus 27 (2 abutments and 29 piers). SP 16-81 K 1020 (3), Riley Co.;
Kan.—**J. A. Tobin Constr. Co.**, 3701 Rainbow Blvd., Kansas City, Kan., CA $1,553,060, superstructure Br. No. 16-81-2.2, Sta. 168 plus 27,100 ft. 138 ft. 27-184 ft. 138 ft. steel girder. SP 16-81 K 1020 (3), Riley Co. Bids Aug. 6. CD 8-1½, under LB.

▲ **KANSAS**—State Hy. Comn., Junction City, Bids opened 8/13,
Kess Constr. Co., 510 Iowa-Des Moines Bank Bldg., Des Moines 9, Iowa, LB $1,463,017 (2 bidders), concrete pavement 6.533 mi. SP 70-31 I 70-5(29) 294, Geary Co. CD 7/23.

▲† **Ace Constr. Co.**, 8711 Shamrock Rd., Omaha, Neb., CA $2,247,742, Schedule I, relocation Missouri Pacific R.R., Tuttle Creek Dam and Reservoir and Big Blue River area near Manhattan, CIVENG-23-028-59-121, KANSAS. U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo. Bids July 30. CD 7/16;
List & Clark Constr. Co., 2 W. 40th St., Kansas City, Mo., CA $549,706, Schedule II, of relocation Missouri Pacific R.R., Tuttle Creek Dam and Reservoir and Big Blue River area, near Manhattan (Kansas).

▲† **Brown-Boveri Corp.**, 19 Rector St., New York, N. Y., LB $2,003,660, three turbine generators, Eufaula Reservoir, ENG-34-066-59-106, OKLAHOMA. U. S. Eng., Box 61, Tulsa, Okla. Bids July 30. CD 7/22.

▲ **H. B. Zachary Co. Constr. Div.**, Box 10188, San Antonio, Tex., CA $1,445,000, 42 mi. 20 and 24 in. crude line near Kingsville from Kings Ranch, Kleberg Co., TEXAS. Humble Oil & Refining Co., 1216 Main St., Houston, Tex. CD 6/11/58.

▲ **TEXAS**—State Hy. Comn., Austin, Bids opened 8/18,
Tex.—**Dodds & Wedegartner, Inc.**, Box 1751, San Benito, Tex., LB $688,012, flex. base, b. conc. 0.662 mi. U.S. 83, Proj. U 93 (12), Cameron Co.;
Tex.—**Border Road Constr. & Ross C. Watkins**, Box 647, Laredo, Tex., LB $969,588, flex. base, b. conc. 2.855 mi. Hy. I.H. 35, Proj. I 35-1 (5) 5, Webb Co., foregoing CD 7/23.
Tex.—**B.H.C. Materials Co. & Fred Hall & Sons**, Box 234, Temple, Tex., LB $425,635, base and hot mix b. conc. 3.603 mi. Hy. U.S. 190, Proj. C 231-3-19, Bell Co.;
Tex.—**Century Constr. Co.**, Box 5175, Houston, Tex., LB $1,321,230, cement stab. base, hot mix b. conc. 11.49 mi. Hy. St. 35, Proj. C 178-2-17, etc., Brazoria Co.;
Tex.—**H. B. Zachry Co.**, P.O. Box 10188, San Antonio, Tex., LB $2,981,959, flex. base, hot mix b. 9.26 mi. Hy. IH 35, Proj. I 35-3 (10) 213, Hays Co., foregoing CD 8/3.

▲† **George A. Rutherford, Inc.**, P.O. Box 1778, Albuquerque, N. M., CA $1,657,000, NIKE-HERCULES facility, Walker Air Force Base, Inv. No. ENG-29-005-59-123, ROSWELL, N. M. U. S. Eng., P.O. Box 1538, Albuquerque, N. M. Bids June 23. CD 6/30, under LB.

BUILDINGS—LB & CA

▲ **Spiegelberg Lumber & Building Co.**, Laramie, Wyo., LB $2,140,000, est. $2,200,000 (6 bidders), HIGH SCHOOL, CHEYENNE, WYO. School Dist. No. 1, 2118 Central Ave., Cheyenne, Wyo. Bids Aug. 18. CD 8/3.

FAR WEST

BUILDINGS—BA

▲ **Utah, Provo** — ADMINISTRATION and GENERAL SERVICES—BA 9/15—Brigham Young University, 3 story, bsmnt., 96,000 sq. ft. administration and general services bldg. at University. Over $2,000,000. Fetzer & Fetzer, 415 Zions Savings Bank Bldg., Salt Lake City, archts. CD 7/9.

▲ **Calif., San Luis Obispo**—LITTLE THEATER-MUSIC BLDG.—BA 9/30—State Div. Architecture, 1100 S. Grand Ave., Los Angeles, 2 story, 55,000 sq. ft. floor area, air conditioning, etc., rein.-con. little theater-music bldg. California State Polytechnic College, W.O. 4160GC-16. $1,300,000. Plans deposit $100. CD 12/4.

HEAVY CONSTRUCTION—LB & CA

▲ **IDAHO**—State Hy. Dpt., Boise,
Hoops Constr. Co., Twin Falls, Idaho, CA $2,529,768, 4-lane divided roadway, drainage structures, 4 grade separation structures and plant mix bit. surf. 10.341 mi. Interstate No. 80N, and roadway, drainage structures and plant mix bit. surf. 0.524 mi. US 30 connection, Payette Co. Bids July 14, awarded Aug. 13. CD 7/21, under LB.

▲ **Morrison-Knudsen Co., Inc.**, P.O. Box 450, Boise, Idaho, LB $4,734,656, est. $4,000,000 (13 bidders), 480,220 ft. 8- to 36-in. sewer mains and 228,300 ft. 4 and 6 in. service connections, BOISE, IDAHO. Boise Bench Sewer Dist., 407 N. Orchard St., Boise, Idaho. Bids Aug. 13. CD 7/16.

▲ **CALIFORNIA**—State Div. Hys., 1120 N. St., Sacramento, Bids opened 8/19,
Madonna Constr. Co., P.O. Box 910, San Luis Obispo, Calif., LB $4,739,175 (10 bidders), grading, paving 5.1 mi. 4 lane freeway U.S. Hy. 40, 111-Pla-37-D, Placer Co. CD 7/15.

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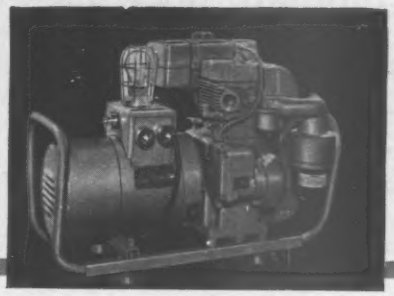

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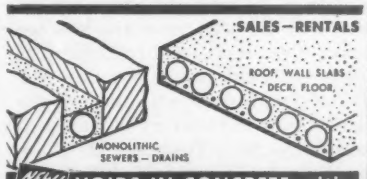

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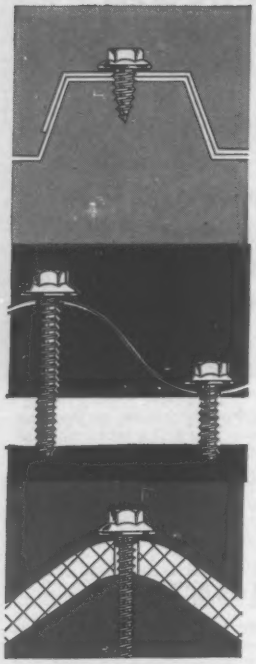

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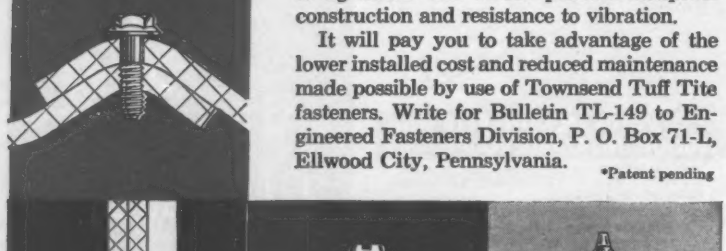

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Engineered Fasteners Division

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In Canada: Parmenter & Bulloch Manufacturing Company, Limited, Gananoque, Ontario

▲ Fred S. Macomber, 4704 E. McKinley Ave., Fresno 2, Calif., CA $1,894,000, Fresno Air Terminal, concourse bldg., fire station, admin. and tower, maintenance, hangar-apron work, roads, at airport, FRESNO, CALIF. City, City Hall, 2326 Fresno St., Fresno, Calif. Bids July 28. CD 8/18, under LB.

BUILDINGS—LB & CA

▲ The Austin Co., 16112 Euclid Ave., Cleveland, O., CA Over $1,500,000, 1 story, part bsmnt., 190 x 450 ft. SCIENTIFIC RESEARCH LABORATORY, SEATTLE, WASH. Boeing Airplane Co., 7755 E. Marginal Way, Seattle 4, Wash. CD 7/1.

▲ Marjan Development, Inc., 9562 Ball Rd., Anaheim, Calif., CA $1,418,500, 122 stucco DWELLINGS, Tract 3371, ANAHEIM, CALIF. Tyee Park Estates, 9562 Ball Rd., Anaheim, Calif.

▲ Flowers & Shirley & Robert C. Allen, 2150 Princeton Ave., Los Angeles 26, Calif., CA $1,712,800, JUNIOR HIGH SCHOOL BLDGS., PARAMOUNT, CALIF. Paramount Unified School Dist., 15110 South California Ave., Paramount, Calif. Bids Aug. 11. CD 7/22.

▲ Pardee Bldg. Corp., 10639 Santa Monica Blvd., Los Angeles, Calif., CA $1,302,720, 131 DWELLINGS, Clairmont Mesa Tract No. 6, SAN DIEGO, CALIF. Hoyt S. Pardee, 10639 Santa Monica Blvd., Los Angeles, Calif.

▲ Barnhart Constr. Co., 785 Walsh Ave., Santa Clara, Calif., CA $1,450,281, Pioneer HIGH SCHOOL, Kooser Ave., SAN JOSE, CALIF. San Jose Unif. School Dist., 408 Almaden Ave., San Jose, Calif. Bids Aug. 4. CD 8/12, under LB.

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
September 16 Ontario

HEAVY CONSTRUCTION—LB & CA

▲ ONTARIO—Dpt. Hys., Parliament Bldg., Toronto, Bids opened 8/12,
Hacquoil Constr. Ltd., 1408 Brown St., Fort William, Ont., LB $1,621,592, grading, culverts, granular base, 9 mi. Trans-Canada Hy. 17 from Longbow Corner easterly (Contract 59-223), Longbow Corner. CD 7/30.

BUILDINGS—LB & CA

▲ Christensen & Macdonald Ltd., 612 Tegler Bldg., Edmonton, Alta., CA $1,300,000, rein.-con. RACING STABLES, Edmonton Exhibition grounds, EDMONTON, ALTA. Edmonton Exhibition Assn. Ltd., Edmonton, Alta. Bids June 30, awarded Aug. 12. CD 6/25.

▲ Peter Leitch Constr. Ltd., 170 Scott St., Winnipeg, Man., CA $1,350,000, 1 story, concrete HARDWARE, GROCERY AND DRYGOODS WAREHOUSE, ST. JAMES, MAN. Federated Co-Operatives Ltd., 230 Princess St., Winnipeg, Man. Smith, Carter, Searlex Assocs., 65 Dewdney St., Winnipeg, Man., archts. Awarded Aug. 12.

▲ Pigott Constr. Co., Ltd., 1250 Bay St., Toronto, Ont. CA Est. $3,000,000, 7 story, bsmnt, 46 x 228 ft. HOSPITAL ADDN., TORONTO, ONT. St. Joseph's Hospital, 1830 Queen St. W., Toronto, Ont. Marani, Morris & Allan 1250 Bay St., Toronto, Ont., archts. A. M. Lount & Assocs., 749 Yonge St., Toronto, Ont., engrs.

▲ Sirotek Constr. Ltd., 1305 Baseline Rd., Ottawa, Ont., CA $1,622,000, steel, brick BUS DEPOT and HEADQUARTERS BLDG., OTTAWA, ONT. Ottawa Transportation Comn., Bank St. and Kent Ave., Ottawa, Ont. Bids July 24, awarded July 30. CD 8/3, under LB.

▲ Anglin-Norcross Quebec Ltd., 892 Sherbrooke St. W., Montreal, Que., CA Est. $20,000,000, 31 story OFFICE, southeast corner Dorchester Blvd. W. and University Ave., MONTREAL, QUE. Dorchester-University Holdings Ltd., c/o The Royal Trust Co., 105 St. James St., Montreal, Que. D'Allemange & Barbacki, 3180 Van Horne Ave., Montreal, Que., engrs. CD 2/10.

LATIN AMERICA

HEAVY CONSTRUCTION—BA

▲ Argentine—POWER LINE—BA 10/1—Power Dpt. of Province of Buenos Aires. Direccion de Energia, La Plata, Buenos Aires, 110 mi. 62 kv overhead tension power line between Bahia Blanca and city of Pigue, Buenos Aires. $1,400,000.

U. S. POSSESSIONS

HEAVY CONSTRUCTION—BA

▲† CANAL ZONE—BA 12/2—Panama Canal Co., Balboa Heights,
superstructure of Balboa Bridge over Panama Canal. $12,000,000. Sverdrup & Parcel, Inc., 915 Olive St., St. Louis, Mo., U.S.A., engr. CD 8/5.

AMERICANS ABROAD

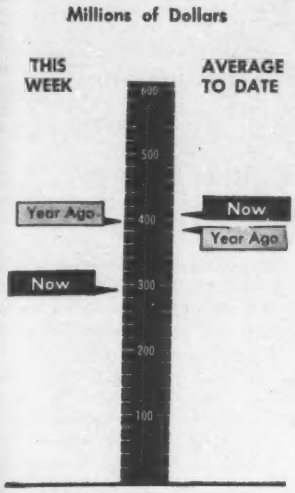
HEAVY CONSTRUCTION—LB & CA

▲ Brown-Pomeroy-Hawaiian (Brown Engineers International, Inc., Pomeroy Constructors, Inc. and Hawaiian Dredging & Constr. Co. Ltd. International) 60 W. 55th St., New York 19, N. Y., CA Est. $20,000,000, Port of Damman Arabian Gulf, SAUDI ARABIA. Ministry of Communications, Kingdom of Saudi Arabia, Riyadh, Saudi Arabia. Brown Engineers, 60 W. 55th St., New York, N. Y., U.S.A., consult. engrs.

(Proposal Advertisement see pp 81 to 83)

Construction Scoreboard

CONTRACTS ...



AMOUNT OF CONTRACTS LET

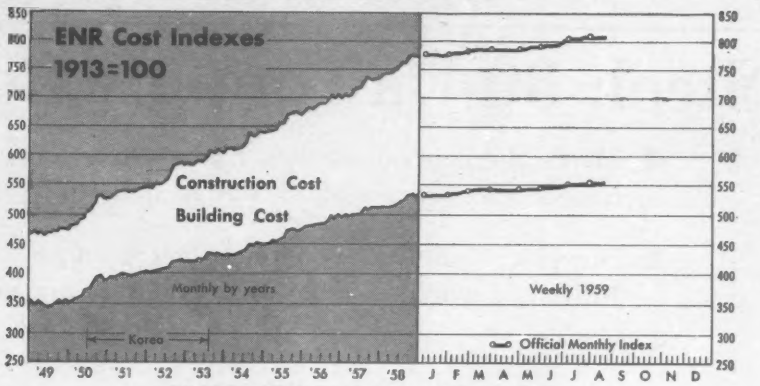
	This Week	Cum. 35 wks 1959	Chge '58-'59 %
	millions		
All Heavy Constr....	$293.0	$14,325.1	+ 4
By Ownership			
PRIVATE	140.2	6,973.4	+22
PUBLIC	152.8	7,351.7	− 8
State & Municipal..	131.2	5,273.4	− 8
Federal	21.6	2,078.3	− 8
By Type of Work			
PUBLIC			
Waterworks	4.6	295.3	+34
Sewerage	12.4	455.5	+ 8
Bridges*	4.8	547.0	+14
Highways	61.8	2,137.0	− 8
Earthworks, Dams & Waterways	15.9	654.0	−16
Buildings:			
Excl. Housing	30.7	1,824.3	− 1
Housing	2.9	468.5	−48
Unclassified	19.7	977.6	− 9
PRIVATE			
Buildings			
Mass Housing	46.5	3,150.2	+15
Commercial	37.8	1,571.5	+16
Industrial	22.0	1,886.0	+46
Unclassified	33.9	358.2	+13

*Includes private bridges

NOTE: Minimum size projects included are: Waterworks and waterways, $53,000; other public works, $88,000; industrial buildings, $110,000; other buildings, $400,000.

CAPITAL . . .

New Capital For Construction	Week of Aug. 20	Cum. 34 wks 1959	Chge '58-'59 %
	millions		
Corporate Securities..	$ 35.7	$2,484.8	−33
State and Municipal:			
All Except Housing.	132.9	4,196.1	− 3
Housing	....	75.2	+122
Federal Loans	2.3	94.3	−32
Federal Aid	....	2,858.0	....
Total Nonfederal	$170.9	$9,708.4	+19
Federal Appropriations:			
Projects in U. S....	$	$ 345.5	−59
Outside U. S.....	....	4.4	−30
Total New Capital...	$170.9	$10,058.3	+11



CURRENT COST INDEXES

ENR INDEXES (1913=100), 20-cities' average	Week of Aug 20 1959	% Change from July 23 1959	% Change from Aug 21 1958
Construction Cost	812.17	−0.06	+5.06
Building Cost	556.01	+0.08	+4.06

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.

BACKLOG OF PROPOSED HEAVY CONSTRUCTION

	July 1959 (millions)	Percent Change from last Month	Year
Total U. S. (ENR reported).....	$113,769	−0.3	+2.0
By Ownership—			
Private.....	50,014	+0.4	+4.3
State & Municipal.....	50,436	−0.7	0
Federal.....	13,319	−1.5	+1.2
By Type of Work—			
Waterworks.....	2,667	−1.0	+0.4
Sewerage.....	3,594	−0.2	+5.3
Bridges.....	3,362	−0.2	+0.3
Highways.....	12,576	−1.8	−4.5
Earthwork, Waterways.....	11,582	−1.0	−0.8
Public Buildings.....	20,494	−0.5	+3.2
Industrial Buildings.....	16,981	+0.5	+2.7
Commercial Buildings.....	22,552	+0.4	+4.7
Unclassified, Private.....	10,481†	+0.4	+6.1
Unclassified, Public.....	9,479	−0.9	−0.1

†Includes private bridges, $91 million

FLOW OF NEW PROJECTS INTO THE BACKLOG

	1959 July	1959 7-months	Percent Change from '58 July	Year Cum.
	(millions)			
Total U. S. (ENR reported).....	$1,186	$10,894	+25.6	+19.8
By Ownership—				
Private.....	837	6,039	+91.6	+47.4
State & Municipal.....	302	4,046	−15.4	− 4.6
Federal.....	47	809	−68.8	+ 7.0
By Type of Work—				
Waterworks.....	17	245	−12.0	−34.8
Sewerage.....	46	352	+43.8	− 4.8
Bridges.....	4	248	−43.9	− 3.4
Highways.....	18	996	−71.9	− 8.2
Earthwork, Waterways.....	9	126	−55.1	−15.3
Public Buildings.....	204	2,264	−41.1	+ 7.1
Industrial Buildings.....	260	1,914	+300.9	+156.9
Commercial: Mass Housing.....	244	1,806	+25.4	+36.4
Other Building....	266	1,598	+61.2	−11.8
Unclassified, Private.....	68*	720**	+435.9	+231.8
Unclassified, Public.....	50	624	+192.6	− 3.7

*Includes private bridges, $0.9 million
**Includes private bridges, $9.1 million

FLOW OF PROJECTS OUT OF THE BACKLOG INTO CONTRACTS

Total U. S. (ENR reported).....	$1,153	$6,436	− 7.0	+ 0.1
By Ownership—				
Private.....	407	2,191	+79.8	+22.0
State and Municipal.....	518	2,831	−19.2	−15.2
Federal.....	228	1,414	−38.8	+ 9.2

Steel: 30-Day Supply Left

- **That's the general outlook for construction. But some jobs are halted, and big new starts will be delayed.**
- **However, if the strike continues much longer, most of the industry will be in trouble. Some manufacturers are already hurting.**

The construction industry generally can take another 30 days of strike in the steel industry.

There may be some jobs stopped or delayed, but they are the exception. In fact, many structural steel fabricators, contractors and some producers of building supplies told ENR reporters they can run another two to three months without being seriously pinched.

Many construction equipment manufacturers show signs of running out. Most are reluctant to reveal their inventory position, but those who commented were on the pessimistic side. A couple of producers already are running at reduced speed—one at 50% to 60% of normal.

But should the strike outlast the huge inventories laid in, the repercussions will be sharp. Estimates by equipment and materials suppliers of the time that would be needed to regain full production ran from two months to more than five. Most of them, however, expect the strike to end before they run out.

In many cases, contractors and fabricators apparently underestimated the extent of their own inventories and those of suppliers.

In late June, some of them had expected to be severely affected within a month after the start of a strike (ENR July 2, p. 74). Now a reappraisal indicates they can go another month without being hurt. Some estimate they could get by for another two months.

Some unusual situations have developed; in Dallas, a warehouse is placing advertisements in newspapers calling for business, because "we have steel for three to four months."

Similar good supplies in other parts of the country bear out a check of members by the American Institute of Steel Construction. It found that steel fabricators held enough material for three months (ENR Aug. 6, p. 23).

In addition to inventories held by contractors and fabricators, a big supply still remains in warehouses. This source will fill in spot shortages in contractor and fabricator inventories, and will allow some contractors to start new jobs not covered by their own inventories.

New starts on exceptionally big jobs are expected to be delayed. In most regions contracts are being written with the starting date contingent upon the date of a steel-strike settlement.

Extent of warehouse supplies of all steel types was reported last week as 3.3 million tons by the American Steel Warehouse Association. The warehouses went into the strike with 3.7 million tons.

In tightest supply are galvanized sheet, metal deck, plate and wide flange beams, contractors and fabricators report. These products, however, were in tight supply even before the start of the strike.

In some areas, the few mills not struck are taking up the slack. In others, foreign steel is filling in when domestic products are unavailable or require extensive shopping. In the latter case, it's quicker to obtain foreign steel.

Use of foreign steel is far from common right now. Only Texas is making big use of imports. Many contractors and fabricators say they would prefer not to use it, but admit that if things get tough enough, it may be their only alternative.

There is little sign that the industry is turning to other materials. Some contractors are looking into the possibility of switching to concrete construction, but the feeling is that such a move is not yet necessary.

Some contractors report higher prices for domestic and foreign steel. Foreign steel is generally above pre-strike price levels, but still below warehouse prices for domestic steel.

Manufacturers of building materials appear to be hard hit. But some, like American Culvert Co., of Oakland, Calif., have enough plate to last through October.

A Chicago metal products company says it has laid off 80 to 100 workers in five midwest plants. This could delay highway building programs in Illinois, Indiana and Michigan.

And in Milwaukee, A. O. Smith Corp. shut down its pipe mill because it couldn't get heavy steel plate for line pipe used in the petroleum industry.

A Detroit manufacturer of curtain walls and metal doors and windows also is in a poor inventory condition. The company will be crippled early in September if the strike should continue.

Work stoppages and delays are reported in widely scattered areas. More may be added if the strike continues.

Among construction jobs stalled is a 20-story building in Los Angeles being built by Tishman Realty & Construction Company, of New York City. Six floors of steel are up.

In San Francisco, some delay in fabrication of steel for the Benicia-Martinez Bridge is reported. Also held up in the same area are a county administration building and part of a high school job. In Buffalo, N. Y., a bridge job is halted.

Despite the relatively optimistic sentiments expressed by construction men, spokesmen for the Eisenhower Administration say the construction industry is most vulnerable to a continuation of the strike.

Until now, the secondary effects have been moderate; about 100,000 persons were laid off as of July 31, the Labor Department reports. Most of these are in construction, brick refractories, transportation and coal mining.

In principal steel-producing and consuming centers, 11,300 construction workers are off the job. Most were working on projects at steel plants.

The Labor Department feels that additional secondary layoffs in August will be relatively small, but expects September will bring "sizable" layoffs in construction, metal working, mining.

But as unemployment swells and materials grow short, pressures are mounting on both the Administration and the management-labor negotiators. The facts reported by Labor Secretary James P. Mitchell might be counted as a form of pressure. However, Mr. Mitchell apparently has ruled out use of Taft-Hartley injunctions for at least a month as a means to end the strike.

(*B&F continued p. 74*)

Normal shoot and shovel job turned over to Michigan Scrapers

19 yd pans loaded in shale-sandstone by ripper-dozer. Load time: 30 seconds

Try digging your heel into the tight shale-sandstone terrain on this 11-mile Highway 54 relocation job east of Owensboro, Kentucky—and you'd say the soil was tough enough to shoot. But a cost-conscious dirtmover—Perrin Construction Co of Cynthiana, Ky—decided to tear it up with ripper-mounted dozers, then load with high-powered scrapers. A gamble? Perhaps. But Perrin held a pair of aces—two 262 hp, 19 yd Model 210 Michigan Scrapers.

14 pay yards per trip

First step in moving the rocky material was for the ripper-equipped 200 hp dozer to slice through the borrow area. Only one or two passes were needed to break the shale-sandstone sufficiently for the Michigans—which were then pusher-loaded. Load times, with 200 hp pusher, ran from 30 to 50 seconds. Loads weighed out at 14 pay yards. Cycles were fast . . . so fast, in fact, that on hauls of less than 1,000 feet, it took both the big pusher and a 141 hp tractor to both rip and keep up with the two Model 210's. The smaller pusher, too, needed less than a minute to heap the Michigans.

14 trips per hour

In a typical three-shift period, over typical 2,000 foot one-way hauls, the two Michigans moved 10,000 pay yards. Each machine chalked up about 200 pay yards per 50-minute hour—making 14 to 15 trips over the 4000 ft cycle. Haul speeds averaged 20 mph.

Much less tire wear

According to Mr. Perrin, "The Michigans had no trouble picking up the shale. They have lots of power and payload capacity. We especially like their torque converter drive for this rough material work. It reduces wheel spin and tire wear. With ordinary scrapers, you know, an impatient operator could grind up the drive tires within a month."

Demonstrations now available

We'd welcome the opportunity to show *you* how Michigan's power shift-torque converter drive, high ratio of hp to weight, and its high capacity (three sizes: 10½, 19, 29 yards) all can combine to boost *your* production and efficiency. Call us for a demonstration—*soon*—before you bid your next job.

Michigan is a registered trademark of

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2401 Pipestone Road
Benton Harbor 5, Michigan

In Canada:
Canadian Clark, Ltd.,
St. Thomas, Ontario

CLARK EQUIPMENT

Public Works Trend Is Down

Declines in public housing, nonresidential building, earthwork-dams-waterways drag awards down 8%

The postwar boom in public works contracts is starting to fade.

For the first seven months this year, state and local awards showed a 6% decline from 1958's all-time high (ENR Aug. 6, p. 104). This week the gap widened to 8%.

Five major types of state and local public works are running ahead of last year's award volume: waterworks, sewerage, bridges, airports and tunnels and subways (see table).

But only the first three categories are still growing, according to the annual rate of awards as measured by the 12-month moving total ending July 31, 1959.

Declines in other key public works markets are chiefly responsible for reversing the upward trend.

Public nonresidential building, public housing and earthwork-dams-waterways trail last year's volume by 12% to 53%.

Moreover, their annual rates have dropped almost as sharply from recent peaks.

Now, in addition to these steep declines in the public works markets, there is the threat of a cutback in the Interstate program.

Impact of such a cutback would have serious effects on contractors and suppliers to the construction industry. It would also take some of the glow from the new orders forecast by construction machinery manufacturers and possibly have an adverse effect on their earnings during the rest of this year (ENR Aug. 20, p. 110).

The highway construction market has already weakened because of the financing debacle in Congress. The decline of 1% in highway awards at the end of the first seven months now is opened to 8% this week as awards have dropped precipitously.

The decline in new proposed public works, which started about three years ago, shows that new plans are no longer rising faster than contracts. And the current sharp decline in new proposed work has pulled volume well below the contracting rate.

That means pressure for future construction is diminishing fast. The new downtrend in awards may continue for two or more years. Reason: It takes that long for most public works projects to move through the planning stage into contract. Thus a future upturn in proposed work would take almost two years to halt the slide in awards.

Since the end of World War II, the climb in public works contract awards has shown consistent growth. There have been periods when the volume of contracts leveled out and also dipped. Then awards would start a new climb, with a consistent trend up through the years, backed by a rising flow of work into the state and municipal backlog of proposals.

Now the inventory of proposals is down, and contracts over the long term will follow.

State, Local Contract Trends by Work Type

(in millions of dollars)

Type of Construction	First 7 Months 1958	First 7 Months 1959	Chg. %	How the 12 Months Total as of 7/59 Compares with: %	12 Mos. Peak* (12th mo.)	Apr. '59* %
State & Municipal-Total	$4,732.8	$5,030.0	− 6	− 5	(4/59)	− 8
These are ABOVE '58						
Waterworks	268.4	199.2	+ 35	− 9	(5/57)	+ 2
Sewerage	404.0	363.4	+ 11	....	(7/59)	+ 2
Bridges	479.6	423.2	+ 13	− 1	(10/58)	+ 1
Airports	81.4	79.8	+ 2	−10	(5/59)	−10
Tunnels & Subways	57.2	24.9	+130	− 5	(5/59)	− 5
These are BELOW '58						
Highways	1,932.2	1,944.4	− 1	− 2	(2/59)	− 2
Earthw'k-Dams-Waterways	146.8	313.2	− 53	−49	(7/58)	−41
Building (excl. housing)	1,121.1	1,268.4	− 12	−10	(7/58)	− 9
Public Housing, Total	156.5	299.7	− 48	....	.....	....
Slum Clearance	102.7	203.4	− 50	−34	(12/58)	−26
Other	53.8	96.3	− 44	−36	(9/58)	−26
Other "Unclassified"	85.6	113.8	− 25	....	.....	....

*Peak in 12-months moving total of all state and municipal contracts

Too Much, Too Little

Delaware's short of money, but bridge rolls in it

Delaware agencies are simultaneously encountering feast and famine.

On one hand, the Delaware Memorial Bridge near Wilmington is making too much money. But state agencies are so short of funds for construction programs that projects under way may be halted and new starts delayed. What's more, the legislature adjourned until January without authorizing $25 million in bonds. Now 6,000 to 9,000 men employed on public works projects are threatened with layoff.

The bridge, only eight years old, has already earned about $5.5 million more than its bonded indebtedness, with 61% of the bonds paid off. This embarrassment of riches hurts more because under authorizing legislation, full debt retirement isn't required until 1978. To forestall the day when the bridge will become free, tolls have been slashed, but even this move won't prevent an early "mortgage burning."

Annual bridge maintenance costs of $1 million will have to be paid out of the state Treasury when the bridge becomes free. State officials want to avoid this at all costs. There is even talk of selling $6 million more in bonds to build new approaches and supporting facilities, which would aid in preventing the bridge from becoming toll-free in a hurry.

But while the Delaware Interstate Highway Division (administrator of the bridge) is rolling in money, other state agencies are strapped. An omnibus bond bill for $25 million failed to pass the legislature when political maneuvers forced the adjournment.

However, there are few who believe that the lawmakers will stick with that decision. Pressure from contractors demanding money due them and subsequent unemployment in public works construction are expected to be too great to withstand.

The bond bill proposed includes $10.2 million for school and university construction, $14 million for state highways and county roads and $350,000 for beach-erosion control.

Intensifying the state fund shortage is the financial shape of the Interstate highway program. Delaware is banking on a $6-million federal payment for roads, and now this is expected to be delayed until Congress resolves the financial problems of the Trust Fund. Delaware has already halted contracting for federal-aid roads.

(*B&F continued p. 76*)

6 YARDS PER PASS

A seventeen yard tandem-axle truck loaded in 90 seconds!

A twelve-yard semi heaped in 60 seconds!

Over 500 yards loaded EVERY HOUR by just one Tractor Shovel

Someone's dream? Not any more! It's been standard practice on general contractor J. R. Cianchette's jobs near Pittsfield, Maine, for almost a year now. That's when his big 6 *yard* Model 375A Michigan Tractor Shovel went to work.

Cianchette's problem up until then had been a common one: "How to hold down loading costs and still meet increased production demands."

At first, purchase of more of the fastest rubber-tired 2 to 2¼ Tractor Shovels available seemed the best solution. Then, local Michigan distributor, Portland Tractor Co., showed Company President J. R. Cianchette the new 6 yard Michigan. When Cianchette saw the big rig in action, he bought!

Michigan output totals 8,000 yards per 16 hour day

Today, the big Michigan truck-loads and plant-feeds over 500 yards of sand and stone *every hour*. "Despite its size, our operators would rather run this big Tractor Shovel than any other," says Mr. Cianchette. "Like all Michigans, it's well-balanced, easy maneuvering, easy operating. It has the right weight and power to handle its bucket. Its smooth operation keeps operator efficiency high all day—even though the one operator alone loads as much sand and stone as can three men on three 2 yard rubber-tired Tractor Shovels."

Excavates sub-base, loads concrete, does many similar scattered odd jobs

Such high production gives the 6-yard Michigan extra time to do all kinds of odd jobs on Cianchette's bridge, road, housing development and airport contracts. For example, it loads out broken concrete runway pavement. It has excavated for new and deeper runway and apron subbases. It backfills around new foundations, footings and slabs. Tows disabled vehicles to the service shop. Unloads trucked-in expansion tanks, reinforcing steel, metal culverts, concrete pipe. Grades haul roads on the work sites. Even loads small five and six-yard trucks with bank-run dirt . . . *needs only one pass (20 to 30 seconds) per truck.*

In all, Mr. Cianchette figures his big new Michigan has cut loading costs "more than 50%." *Perhaps 6 yard "bites" can do the same for you!* Talk it over with your Michigan Distributor before planning your next job.

Michigan is a registered trade-mark of

CLARK EQUIPMENT COMPANY

Construction Machinery Division

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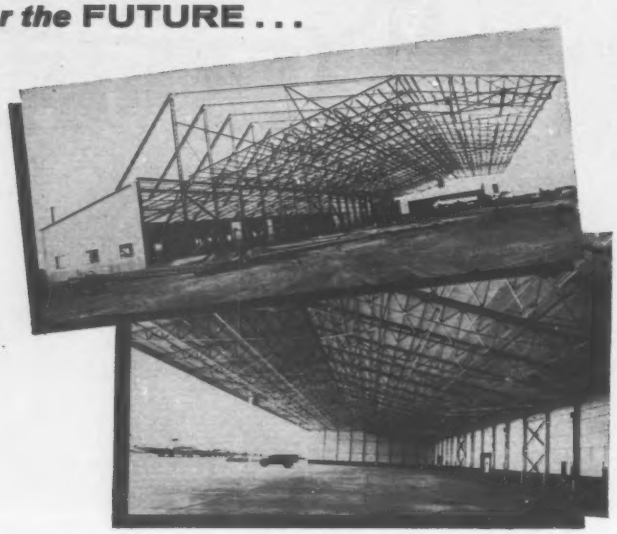
the ERWIN-NEWMAN Suspended Cantilever HANGAR

Engineered for the FUTURE . . .



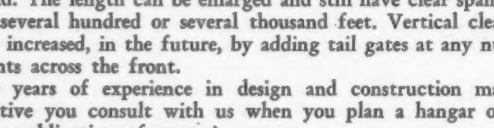
UNOBSTRUCTED CLEAR SPAN SPACE!

EXPANDABLE . . .

IN HEIGHT • IN LENGTH • IN DEPTH

ERWIN-NEWMAN hangars are built with an expandable future in mind. The length can be enlarged and still have clear span space up to several hundred or several thousand feet. Vertical clearance can be increased, in the future, by adding tail gates at any number of points across the front.

Our years of experience in design and construction make it imperative you consult with us when you plan a hangar of any size (no obligation of course).



DESIGNERS AND CONSTRUCTORS

P. O. BOX 1308 U. S. Patent No. 2,687,102 HOUSTON, TEXAS

Due to certain patent infringements it is necessary to publish this

IMPORTANT PATENT NOTICE

The Erwin-Newman Suspended Cantilever Hangars are covered by United States Patent No. 2,687,102, and similar foreign patents issued to us and under which we hold exclusive rights. We have not (at this writing) issued any licenses of other authorization for the design, engineering, construction or use of these patented hangars. The Erwin-Newman Company must and will, protect its rights under these patents against infringements.

Up and Down

Big consultants lose, smaller ones gain

Hardest-hit by the drop in consulting engineering work during 1958 were the larger consultants—those handling over $1 million in volume.

The over-$1 million firms had a 26% drop in business between 1957 and 1958, while consultants in the $100,000-$500,000 and $500,000-$1 million categories scored moderate gains. This is shown by ENR's annual analysis of all firms doing a minimum of $100,000 in new business last year (estimated construction cost of proposed projects).

Consulting organizations that put $1 million or more in new jobs on the books last year are 5% fewer in number, handled 7% fewer projects and did 26% less business than in 1957.

By contrast, those in the $500,000-$1 million class are 6% more numerous, handled 9% more projects and did 8% more business in 1958 than in 1957.

The $100,000-$500,000 group showed a 3% gain in number to 579, a new high. There was only a fractional increase in new projects. However, a surprising 10% increase in new business brought the volume for this group to a record $147.4 million.

Last year, the over-$1-million consultants got 93.4% of the $4.9 billion in work booked by firms covered in the ENR analysis. In boom 1956, these consultants got 96.5% of the work. Less design work for highways and industrial buildings accounts for part of the decline.

In contrast, the middle-sized group—$500,000 to $1 million—upped their share to $3.6% from 2% in 1956. This gives them a new record volume of $180.2 million. Similarly, the amount of new work garnered by the $100,000-$500,000 group rose to 3% in 1958 from 1.5% in 1956.

The picture is the same when the totals are broken down by type of work. There were fewer firms last year among the biggest consultants in every type of work except buildings-other-than-industrial. Only sewerage and airport projects provided the big consulting firms with more work in 1958 than the year before.

The smaller firms scored sizable gains in these types of work and also increased their business in other categories. Medium-sized firms added 38% in waterworks projects, tripled their earthwork-dams-waterways jobs and added 3% in unclassified construction (excluding building) and 1% in building (other than industrial) design work.

(Continued p. 79)

Replaces two crawlers and a compactor with one Michigan... ups output 50%...

Cuts compaction costs $15 per hour

By buying a machine with a "built-in bonus," a midwest roadbuilder is saving at least $15 per operating hour.

Tri-County Trucking Company of Detroit subbed the sand sub-base and all aggregate haul—about 500,000 yards—from Holloway Construction Co, Livonia, Mich, on a 9-mile leg of new Interstate Highway 23 north of Toledo. The sub-contractor knew he'd be pushing a lot of sand fill, so he got to thinking. Sand is hard on crawler tracks—so why not use a heavy rubber-tired dozer?

The unit chosen was a 262 hp, 51,000 lb Michigan Model 280 Dozer. Each 26.5-25 tire was hydroflated with calcium chloride solution—1,750 lbs per tire. Rig was put to work two shifts per day, 6 days per week.

It soon proved fast enough and mobile enough to easily spread the sand delivered by 35 ten to seventeen-yard trucks and semi-trailers. Its output *averaged* 3,000 bank yards (per government cross-section) per 10-hour shift. (In contrast, a 35,000 lb crawler, used elsewhere on the 9 mile job, regularly spread 2,000 yards per shift. Completed lifts in both cases averaged 9 to 12 inches deep.) But there was an unexpected bonus, too . . .

97% Proctor in 2 to 4 passes

The Michigan, working alone, effectively met compaction specs of 95% Proctor. In fact, government tests showed 97% average compaction, after only two to four passes, *including* passes made to spread. No specialized compaction equipment was needed. Thus, says Boyce Grubb, company treasurer, "we eliminated expected use of a tractor-drawn 25 ton roller which, we estimate would have cost us at least $15 per operating hour."

There were other savings too!

1 Michigan's low-pressure tires and rear wheel steer did not tear up fill as other dozers often do!

2 The Michigan alone graded to within a few inches of final specs. According to Supt Tom Quaine, the fill thus required only touchup with a grader.

3 Michigan's 28 mph "go-anywhere" mobility enabled it to move from one end of the grade to another, 9 miles, in 30 minutes or less.

4 Tires, rolling over the sand, instead of grinding in it, saved much of the repair and greasing time needed with each crawler, according to Mr. Quaine.

You can check these savings first hand on *your* job. Just call your Michigan Distributor for a no-obligation demonstration. Four size Michigan Dozers to choose from: 165, 262, 375, or 600 hp.

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NEW-

Tow it into place

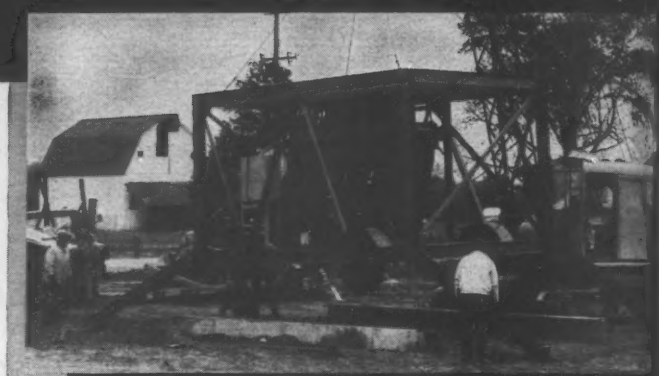
...Weir Contracting Co. tows their Heltzel Unitized, Mobilized Batching plant from previous job site on its own transportation wheels...

Heltzel's new 100 and 150-ton, pushbutton batching plants are now *unitized* and *mobilized* for easier moving—for faster setup—for greater savings of time and money.

The new plant consists of two self-contained mobile sections; hopper section and batcher section (including scales) with new fold-up supporting columns. Both sections have built-in wheel assemblies and towing tongues—ready to roll.

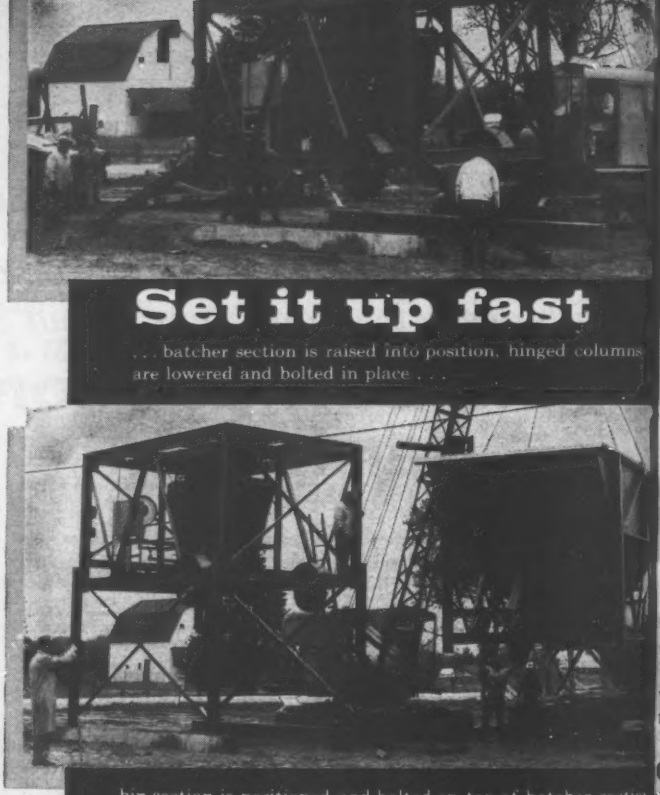
Weir Contracting Company of Detroit, Michigan reports: "... Our first job was in Greenbrier Meadows Subdivision, Livonia, Michigan. After the plant arrived on the site it was ready for operation in a very few hours. We found that the speed of batching will give two complete batches in thirteen seconds. On subsequent work, the plant was dismantled and ready for transportation in two hours and towed by small, single axle dump trucks to the new location. We have found that the built-in transportation wheels save us over $100.00 a move because of not having to rent trailers."

For complete data and specifications contact your nearby Heltzel representative—or write us direct.



Set it up fast

... batcher section is raised into position, hinged columns are lowered and bolted in place . . .



... bin section is positioned and bolted on top of batcher section

Start batching

In just a few hours this full size, high capacity, pushbutton paving plant is ready to operate!

THE HELTZEL STEEL FORM AND IRON COMPANY
WARREN, OHIO

. . . Business and Finance

(Continued from p. 76)

The $100,000-$500,000 consultants gained 60% in the latter category and 84% in earthwork-dams-waterway work. Their unclassified projects rose 27% in volume.

The ENR analysis shows the relative importance to consultants of several types of building design work.

The four top categories of 1958 new work, in order of dollar volume, were:

- Private industrial building, $786.6 million (down 50% from 1957).
- Housing, $428.5 million.
- Schools, $352.6 million.
- Public industrial and military, $211.4 million.

Hawaiian Cement Fight Winds Up in a Draw

Hawaii's "battle of the cement plants" has ended in a partial victory for both of the battling industrialists—Henry J. Kaiser, 77, and Walter F. Dillingham, 74.

Mr. Kaiser will build the $13.5-million plant he wants for his Permanente Cement Co., but not on the site he originally chose. Mr. Dillingham has protected his proposed-resort site from encroachment by the Kaiser plant, but he hasn't shut Kaiser out of the islands and competition with his newly formed Hawaiian Cement Co.

Mr. Kaiser moved to a second site after Dillingham interests successfully blocked his effort to get the original site zoned for industry (ENR June 18, p. 296). On the second site, a few miles from the first location on Oahe Island, he will build a plant with a capacity of 1.7 million barrels of cement per year.

Bids have already been invited for eight silos and a packing plant. Other parts of the plant will be bid soon.

Meanwhile, Mr. Dillingham already has under construction a cement plant with an annual capacity of 1 million barrels. Ironically, it is being built with Permanente cement, the only cement now available in Hawaii.

Contractor to Build Plants To Order, Then Lease Them

The Tishman Realty and Construction Co., New York, has formed a subsidiary that will build and equip factories to order and, while retaining title, lease the structure to the client.

The subsidiary, Tishman Equipment Leasing, Inc., will also lease roadbuilding machines, trucks, tractors, trailers and buses, materials handling machines, and aircraft, electronic and electrical equipment.

New Way To Finish CONCRETE CEILINGS

More and more building specifications require finely finished concrete ceilings. Because of this new requirement, Stow Manufacturing Company has developed the Stow CG Ceiling Grinder—a special machine designed to grind off form marks and fins, cut off nails, and smooth the entire surface.

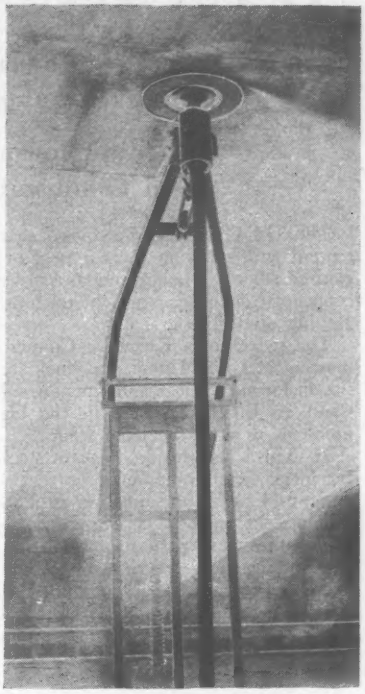
With this machine, one man can average 4,000 square feet per day. Simple to operate, it pushes along like a baby carriage.

To operate the Stow Ceiling Grinder: (A) The operator first sets the pivot arm at about a 45° angle. He then adjusts the grinding disc to proper height by lifting up on the rubber-gripped handle in the center. A ratchet arrangement automatically locks it in position at the height desired. (B) A slight pressure is exerted on the grinding disc by the spring and chain assembly at the opposite end of the pivot arm. (C) A turn-buckle is used to get the most desirable angle for grinding. For ordinary grinding, the disc should be flat against the ceiling, but for cutting nails and removing fins it works better at a slight angle. A spring arrangement is built into the bearing housing to support the grinding disc and absorb any shocks, thus preventing any gouging. Once the machine is adjusted, the operator just pushes it along.

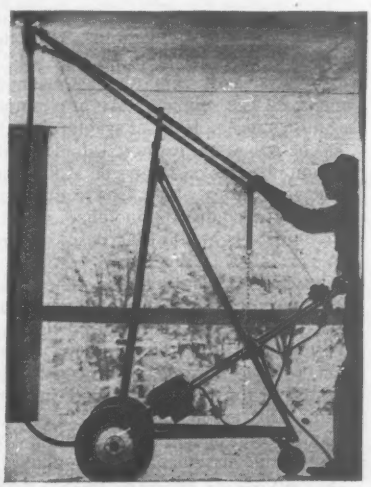
All three models have a 1 HP totally enclosed motor operating at 3450 RPM. The disc is a 9" Bayflex of cotton fibrous material with a silicon carbide abrasive bonded with resin.

Three models are available:

CG 10—for ceilings 8 to 10 ft. high
CG 13—for ceilings 10 to 13 ft. high
CG 16—for ceilings 13 to 16 ft. high



FOG OF CONCRETE DUST



STOW CG CEILING GRINDER

The Stow CG Ceiling Grinder can also be used for grinding walls. For this type work, employ the same flexible shaft as used on the ceilings, but attach a handpiece or anglehead to one end.

Stow Manufacturing Company also makes a complete line of portable electric flexible shaft grinders for both wet rubbing and dry grinding walls. For more information on the Stow CG Ceiling Grinder and a copy of Stow's Grinding Concrete pamphlet, which gives the proper speeds for both wet rubbing and dry grinding, contact your Stow distributor or send in the coupon below. Stow Manufacturing Company, Binghamton, N. Y., also makes a complete line of concrete vibrators, rotary trowels and screeds.

STOW MANUFACTURING CO.
19 Shear St., Binghamton, N. Y.
Please send me Bulletin 5713 on CG Ceiling Grinders.

Name..... Title.....
Company .....
Street .....
City..... State.....

AFL-CIO Mobilizes Its Forces

- **Executive Council says labor is the victim of a business conspiracy to weaken unions and turn back the clock of labor relations.**
- **Its Unity House stand means tougher sledding for construction's "Ten Commandments," Joint Industry Conference, wage freezes.**

The AFL-CIO warned last week that current efforts to clip the wings of organized labor will boomerang and make cooperative labor-management relations a thing of the past.

The federation's Executive Council, meeting at Unity House, Pa., took for the first time a clear and unequivocal stand on the basic issues in the big problems now on the labor scene.

It singled out the deadlock in steel, the bitter debate on labor reform legislation and use of the inflation issue as evidence of a business conspiracy to reverse the whole pattern of labor relations by regaining the right to set unilaterally the terms and conditions of employment for all workers, through a wholesale weakening of the trade union movement.

In an atmosphere markedly—and intentionally—devoid of inter-union feuds and friction, the AFL-CIO promised to present a strong and solid front and to fight back, both economically and politically, with all the resources at its command.

The direct effects on the construction industry are threefold:

• The craft and industrial unions are prepared to bury the hatchet, at least temporarily, and to continue to search within the framework of labor unity for solutions to the jurisdictional problems that have troubled the AFL-CIO since the merger.

In a fresh approach to the general problem of inter-union conflicts, a new committee has been formed to study seven areas of internal friction. Among them are the relative rights of building tradesmen and production workers to perform in-plant construction work; industrial union negotiation of labor contract clauses that limit industrial construction by contract; and mutually destructive secondary boycott and hot-cargo activity.

President Peter T. Schoemann of the plumbers union is a member of the new committee, whose chairman is Al Hayes (machinists). Other members are William Schnitzler (AFL-CIO secretary-treasurer), Joseph Beirne (communications workers) and Walter Reuther (president of the Industrial Union Department).

• The legislative cleavage between contractors and building trades unions may kill the harmony essential to any substantial progress by the Construction Industry Joint Conference.

• Labor's view of its present struggle as one for something more than impotent survival will tend to create stronger resistance to any leveling off of wage rates and to any significant progress on the "Ten Commandment" program.

"This is not good for the industry or the public," said one building tradesman at the Pocono meeting, "but how can we work constructively with those who are always working against us?"

Clearest indication of the depth of this widening breach between labor and management showed up at Unity House in labor's treatment of these three issues:

• Steel strike—The "struggle in steel is not solely, or even primarily, a question of economics," says the AFL-CIO. In the eyes of the federation, it is a "high powered," highly financed campaign developed and directed by "big business" to turn back "the clock of labor-management relations" under the "guise of fighting inflation." It is directed against all employees, the AFL-CIO says, and seeks to give management a "free rein" to take any action against any employee at whatever cost.

The federation expressed its determination "to make the steel strike the struggle of the whole American labor movement" and to mobilize all its strength to fight this "big business conspiracy."

• Economics and inflation—The AFL-CIO accuses the Administration and "its big business allies" of instigating a "politically motivated hysteria about inflation" to make a brain-washed public clamor for wage freezes, hard money, and cutbacks in public welfare programs, while management continues to enjoy "unconscionable tax loopholes," and "no freeze" on prices, profits, stock options and "retirement schemes."

Underneath this camouflage, the AFL-CIO says, is America's key economic problem—continued economic growth. The program proposed by the federation for promoting that growth includes continued increases in wages and salaries, price reductions in some industries, a reversal of the tight money policy, and the inclusion of labor, consumer and small business representative on the Federal Reserve Board. Implicit in the proposals is the argument that consumer purchasing power must be constantly increased in order to promote and support an expanding economy.

• Labor legislation—The AFL-CIO, continuing in the same vein, says "the issues in the legislative fight" have "nothing to do with corruption."

The federation accuses the National Association of Manufacturers and "its allies" of seeking, under a "smoke-screen" of corruption, "to tip the Taft-Hartley scales still more in favor of employers and against workers" and to make it impossible for unions to organize or to be effective at the bargaining table.

Although pessimistic about the outcome of the legislative debate, the AFL-CIO promises that labor "will not be deterred by anti-labor legislation, no matter how vicious it may be."

A logical byproduct of this is that the AFL-CIO is now re-evaluating its political action program. It has under consideration a number of specific, undisclosed proposals for making the program more effective.

In other areas of particular interest to the construction industry, the federation's Executive Council urged:

• Passage of a Federal Area Redevelopment Act to combat "the cancer of chronic unemployment."

• Retention of the $1-billion authorization and the Davis-Bacon prevailing wage provisions in the pending water pollution bill (H.R. 3610).

• Congressional authorization of the San Luis water development program in California—but with the 160-acre land ownership provisions of federal reclamation law applicable.

Labor in Brief . . .

• **Union pay is higher**—A worker on a union job receives, on the average, 8% more in pay than a comparable worker on a nonunion job. So says the AFL-CIO after comparing 1,041 union and nonunion wage scales in comparable occupations in the same industry and same region.

• **Union wins vacation pay**—A new labor contract between a West Virginia contractor and the United Construction Workers provides for vacation pay at the rate of $10 for each completed month of service, travel pay at regular rates for time in transit, and double time for work on six holidays and Sundays.

• **Support for the Teamsters?**—The Oregon AFL-CIO rejected during its annual convention a resolution urging the national AFL-CIO to issue a "come home" call to the teamsters union. Convention delegates sided 2 to 1 with the Resolutions Committee recommendation of "nonconcurrence."

• **"Can't pay" is no excuse**—A National Labor Relations Board trial examiner has ruled that union inability to pay the Brown-Olds penalty in a hiring hall case will not avoid imposition of the penalty. Place to raise questions of hardship is in compliance proceedings.

B.C. Ironworkers End Strike

One of the longest strikes of the year—a 52-day walkout by ironworkers in British Columbia—ended last week when the union accepted a 57-cent hourly increase under a new 27-month contract.

The union earlier rejected the same offer because of a dispute over a boundary line for travel purposes recommended by the Steel Erectors Association.

During the strike, the ironworkers sustained $19,000 in court fines for refusing to obey an injunction to complete the south pier of the second Narrows Bridge, still resting on temporary supports (ENR July 9, p. 120).

An estimated $100 million in British Columbian construction work, stalled by the strike, is now being resumed. But the work may soon be shut down again, this time by the International Brotherhood of Electrical Workers. IBEW rejected a 10-cent wage increase (it is seeking a 35-hour week, instead of 40 hours, with the same take-home pay) and will vote on a strike this week.

One other strike ended last week in Butte, Mont. Butte painters signed a two-year contract with the Painters, Paperhangers and Decorators Association to end a two-week walk-out.

Under another agreement with the eight-member Building and Construction Trades Council, the Butte painters were supposed to get an automatic raise whenever five members of the council got raises. This entitled them to a 17½-cent hourly raise in 1958, which was refused them last year and again this year. Under the new two-year pact, however, the painters get a 20-cent hourly raise this year and 10 cents more per hour next spring.

Pressure is being exerted to end several other strikes currently under way. The San Francisco Chamber of Commerce called upon teamsters, who are out on strike, and trucking concerns in the area to work toward an agreement because "the flow of goods vital to the city's living and economy is grinding to a halt."

Some 6,000 teamsters have been on strike in San Francisco since August 7. They rejected a $10-per-week raise each year for three years, and are seeking instead a $2.75-a-day package increase under a one-year pact. The teamsters have already delayed many construction projects in the area and are making their weight felt with mass-picketing at bridge entrances and industrial areas.

At Glen Canyon Dam, in Page, Ariz., a strike against Merritt-Chapman & Scott Corp. continues into its second month. Key to the dispute is a demand by workers for an additional $6 per day in subsistence pay.

Meanwhile, the unions may bring additional pressure upon M-C&S if they can get unemployment compensation for the strikers from the state. The unions claim members are eligible because M-C&S violated an existing agreement in refusing the subsistence pay.

And in Alaska efforts were still under way last week to mediate the long carpenters' dispute that has stalled construction on a statewide basis.

To Promote Training

International Training Fund grants $90,000

The trustees of the International Training Fund have given another $90,000 to local joint training committees to help pay the cost of training journeymen and apprentices in the plumbing and pipefitting industry. This brings to $733,000 the grand total of such awards since the fund was established.

The awards were made during the sixth annual National Apprentice Contest held by the plumbers union at Purdue University this month.

Purpose of the International Training Fund is to promote, strengthen and improve training programs for plumbers and pipefitters. It was created in 1956 under an agreement between the National Constructors Association and the United Association of Plumbers and Pipefitters, AFL-CIO. The fund is accumulated by employer contributions of two and a half cents an hour for each hour worked by members of the union employed under the agreement.

Only limitation on the use of the funds awarded to local training groups is that they go toward the payment of the cost of approved programs for training journeymen and apprentices in the UA trades. The awards to date have been used for such things as instructors' salaries, textbooks, welding machines and miscellaneous supplies and equipment, including plate steel, pipe, tongs, anvils, vises, electrodes, silver solder and copper tubes and fittings.

The fund is jointly administered by NCA and UA and supplements rather than supplants local financial support. Any of the UA locals and joint apprenticeship committees can apply for aid.

ESA Helps to Provide Investment Opportunity

Engineers and Scientists of America is sponsoring formation of a mutual fund, which ESA President Joseph Amann claims is the "first" in the labor movement.

The fund is called "ESA Mutual Fund." It has already been filed with the Securities and Exchange Commission by ESA and American Diversified Mutual Securities, Inc., which will manage it.

Sale of shares in the fund will be limited to members of ESA.

Investment advisor is Yates, Heitner and Woods of St. Louis. Riggs National Bank will serve as custodian.

(*Labor continued p. 82*)

Canadian Labor Law

Engineers and contractors urge reforms in labor laws

Two Canadian groups, one of engineers and the other of contractors, are seeking changes in existing labor laws.

At the federal level, the Canadian Construction Association has called for revision of the Federal Labour Code and the Federal Construction Contract Form. CCA is composed of more than 1,000 contractors, manufacturers and suppliers in the Canadian construction industry.

Specifically, CCA wants:

- "Clarifications concerning the illegality of picketing and strikes in various forms."
- "A requirement that labour unions obtain civil status as a legal entity just like any other big business."
- "Prohibition of the closed shop."
- "Settlement of jurisdictional disputes by a Board in Canada rather than by one in Washington, D. C."
- Adoption of the Canadian Standard Forms of Construction Contract on federal projects. These forms are approved by professional institutes of architects and engineers. CCA alleges that the Federal Construction Contract Form now in use is "one-sided, outmoded and . . . unreasonable."

Commenting on the proposed legislation, J. Eric Harrington, president of CCA, said: "Canadian Labour legislation—like that in the U.S.A.—has permitted a marked imbalance between the economic power of certain unions and other sections of the Canadian economy. In the past the unions needed protection but today it is the individual employee, management, and the public who need it."

Meanwhile, the Society of Ontario Hydro Professional Engineers is seeking changes in the Ontario Labour Relations Act to give legal force to collective bargaining by engineers. The society represents 780 registered professional engineers employed by the Hydro-Electric Power Commission of Ontario.

The society is asking that professional engineers, now exempted from the Ontario Labour Relations Act, be included in the labor law's coverage. However, the society wants bargaining units for engineers to be limited strictly to professionals, with no allowance for nonprofessional or for trade union affiliations.

The society is opposed in its efforts by the Association of Professional Engineers of Ontario, which is comparable to the National Society of Professional Engineers in the U. S.

OFFICIAL PROPOSALS

RATE: The rate for Official Proposal advertising is $2.40 per line or fraction set solid. Where the advertisement is set other than solid, the space is measured by total space occupied and charged on basis of 12 lines to the inch.

CLOSING DATE: Friday 10:30 A.M. for issue dated the following Thursday.

SEND COPY TO: Official Proposal Division, Engineering News-Record
P.O. Box 12, New York 36, N. Y.

Bids: October 8, 1959.

Construction of Oyster Shell Crushing Plant and Ancillary Services

Sealed proposals for the construction of an Oyster Shell Crushing Plant and Ancillary Services will be received by the Board of Commissioners of the Morgan City Harbor and Terminal District, State of Louisiana, acting as the governing authority of said District, at the City Hall, Berwick, Louisiana, until the hour of 5:00 P.M., Central Standard Time, on the Eighth day of October, 1959, at which time and places the proposals will be publicly opened and read aloud.

The contract drawings, specifications and other proposed contract documents are on file and open for public inspection at the office of the District, 3189 First Street, Berwick, Louisiana, and at the offices of the Engineers, Gulf Federated Consultants Inc., Berwick, Louisiana.

Bona fide contractors may secure from the office of the Engineers a complete set of the plans and specifications upon a deposit of One Hundred Dollars ($100.00) per set for not more than three sets for any one bidder. Additional sets will be furnished on payment of $50.00 per set, which payment is not returnable. Checks shall be made payable to Gulf Federated Consultants Inc., the Engineers. Full refund will be made only to actual bidders upon return of up to three sets of the complete documents in good condition not later than seven (7) days after the date set for the opening of bids.

Contract drawings, specifications and proposal forms will be issued only to "Contractors" licensed by the State Licensing Board for contractors in accordance with Act 233 of 1956; "Contractors" not licensed in the current roster issued by the said Board must furnish a certificate from the said Board showing that they have been granted a permit or license authorizing them to lawfully bid, in order to obtain proposal forms.

Each proposal shall be accompanied by a certified or cashier's check drawn on an incorporated bank or trust company and payable without recourse to the Morgan City Harbor and Terminal District, State of Louisiana, is an amount equal to five (5%) per cent of the bid, as a guarantee that if awarded, the bidder will promptly enter into the contract and furnish the required surety bond on the form provided in the contract documents.

Bids received after closing time will be returned unopened; otherwise, all bids shall remain in full force and effect for sixty (60) days after the aforementioned hour and date.

The Board of Commissioners of the Morgan City Harbor and Terminal District reserves the right to reject any and all bids and to waive informalities.

August, 1959.

MORGAN CITY HARBOR AND TERMINAL DISTRICT
By: /s/ A. J. Pattie
A. J. Pattie, President

ATTEST:
/s/ John Fangue
John Fangue, Secretary

Bids: September 27, 1959.

New York State Road Work

NOTICE TO CONTRACTORS: STATE DE
PARTMENT OF PUBLIC WORKS, AL
BANY, N. Y.,—Pursuant to the provisio
of the Highway Law, sealed proposals wi
be received until ten-thirty o'clock A. M
advanced standard time, which is nin
thirty o'clock A. M., eastern standard tim
on the 10th day of September 1959, i
Henry A. Cohen, Director, Bureau of Co
tracts, 12th Floor, The Governor Alfred E
Smith State Office Building, Albany, N. Y
for the following projects:
DIST. NO. 5, E. G. H. Youngman, Distri
Engineer, State Office Bldg., 65 Court Stree
Buffalo 2, New York.
CHAUT. R. C. 59-147 IRVING-SILVE
CREEK $450.—$8,000.—PLANS—$5.—Ca
taraugus Indian Reservation, BR. 1A
BRIDGE REPAIRS (TEMP. STEEL
BENT-SOUTH ABUTMENT)
Any projects in this letting that are on t
Federal Aid highway systems are subje
to the provsions of the "Federal-Aid Hig
way Act of 1956", being Public Law 8
84th Congress, approved June 29, 1956, an
are also subject to the applicable New Yor
State statutes.
In compliance with the provisions of Se
tion 115 (Prevailing Rate of Wage), Pu
lic Law 627, the minimum wages to be pa
laborers and mechanics are included in wag
schedules that are set out in the bid pr
posal.
Maps, plans, specifications and propos
forms may be seen and obtained at t
office of the State Department of Publ
Works, Bureau of Contracts, Albany, N. Y
and at the office of the District Enginee
noted above, and may also be seen at t
office of the State Department of Publ
Works, 270 Broadway, New York City.
The deposit for Plans and Proposal Form
for each contract is indicated above. A r
fund will be made in full to bidders f
return of one set, in good condition, withi
30 days of award, or rejection of bids; r
fund for all other sets in good conditio
similar period, will be 50% of deposit.
Special attention of bidders is called t
"Information for Bidders" in the Publ
Works Specifications. Award of a contra
is subject to priorities and allocations u
der the Defense Production Act of 1950,
Amended, and all regulations issued ther
under.
Proposal for each contract must be su
mitted in a separate sealed envelope wi
the name and number of the contract plain
endorsed on the outside of the envelop
Each proposal must be accompanied b
draft or certified check payable to the orde
of the "State of New York, Commissione
of Taxation and Finance" for the sum
specified in the advertisement and t
proposal. The retention and disposal
the bidding check, the execution of t
contract and bond shall conform to t
provisions of the Highway Laws, as s
forth in "Information for Bidders".
The right is reserved to reject any or a
bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

OFFICIAL PROPOSALS enable you to get the greatest variety of bids —and so to get the lowest prices consistent with the best work.

U. S. Government

Sealed bids for installation of mail-flo system at the U. S. Post Office, Philadelphia, Pa., will be received until 2:00 P.M., EDST, September 14, 1959, and then publicly opened. Bidding material may be obtained from the Business Service Center, General Services Administration, 250 Hudson Street, New York 13, N. Y.

Many contractors depend entirely upon the

OFFICIAL PROPOSAL COLUMNS

of

Engineering News-Record

for Opportunities to bid. They might not see your announcements if printed elsewhere.

You undoubtedly want their bids on your contracts. Make sure of them on your next contract.

The cost is only $2.40 a line per issue.

OFFICIAL PROPOSALS

Bids: September 15, 1959

New Jersey Turnpike Authority

ADVERTISEMENT FOR PROPOSALS
CONTRACT NO. R-50 (R-50A, R-50B AND R-50C)

Proposals are invited for Contract No. R-50, R-50A, R-50B and R-50C, which involve the repainting of various bridges between Mile 8 and Mile 117 of the New Jersey Turnpike.

Repainting shall consist of cleaning metal surfaces and applying three (3) coats of paint to all exposed metalwork.

Contract No. R-50 comprises all the work required under Contract No. R-50A, R-50B and R-50C.

The extent of the work under each Contract is as follows:

	Contract No. R-50A	Contract No. R-50B	Contract No. R-50C
Number of Bridge Structures	18	47	7
Estimated Tonnage of Steelwork	17,600	18,200	2,300
Mile Limits	104-117	84-101	8-41

Proposals will be received at the New Jersey Turnpike Authority Administration Building, New Brunswick, New Jersey, until 11:00 o'clock Eastern Daylight Saving Time, on the morning of September 15, 1959, at which time and place said proposals will be publicly opened and read.

Contract documents may be examined during office hours on or after August 26, 1959, at the office of the Authority and will be furnished upon payment of Ten Dollars ($10.00) for each set, not returnable.

NEW JERSEY TURNPIKE AUTHORITY
Joseph Morecraft, Jr., Chairman

August 20, 1959

Bids: September 17, 1959

Miscellaneous Work on Erie Barge Canal

NOTICE TO BIDDERS

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Barge Canal Improvement Law and Highway Law, sealed proposals will be received, until 10:30 A.M., D.S.T., September 17, 1959 by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, the Governor Alfred E. Smith State Office Building, Albany, N. Y. for:

Contract U.S. 99 for
New Gates, Lowering the Lower Sill, Replacing the Upper Sill and Other Misc. Work at Lock 19, Erie Barge Canal, Herkimer County, New York

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts, 12th Floor, The Gov. Alfred E. Smith State Office Bldg., Albany, New York.
(b) Department of Public Works, 270 Broadway, New York City, N. Y.
(c) In addition to the above mentioned offices, plans, maps and specifications for Contract U.S. 99 may be examined and obtained at the office of Mr. Lacy Ketchum, 109 No. Genesee St., Utica, New York.

The deposit for Plans and Proposal Forms for Contract U.S. 99 is $10.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

The Engineer's Estimate of Cost for Contract U.S. 99 is confidential and will be made known after all bids have been opened.

Proposals for Contract U. S. 99 must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of five percentum, (5%) of the bid. The retention and disposal of the bidding check, the execution of the contract and bond shall conform to the provisions of the Barge Canal Improvement Law and to the Highway Law as set forth in "Instructions to Bidders" in the contract specifications.

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

OFFICIAL PROPOSALS

Bids: September 17, 1959.

Cleaning and Painting Movable Dam

NOTICE TO BIDDERS

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Canal Law and Highway Law, sealed proposals will be received, until 10:30 A.M., D.S.T., on September 17, 1959 by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, the Governor Alfred E. Smith State Office Building, Albany, N. Y. for:

Contract M 59-10 for Cleaning and Painting Movable Dam 10, Erie Barge Canal and Bridge E-44 Montgomery and Oneida Counties, New York

Engineer's Estimate for M 59-10 is $33,000.

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts, 12th Floor The Gov. Alfred E. Smth State Office Bldg., Albany, New York.
(b) Department of Public Works, 270 Broadway, New York City, New York.
(c) In addition to the above mentioned offices, plans, maps and specifications for Contract M 59-10 may be examined and obtained at the office of Mr. Lacy Ketchum, 109 No. Genesee St., Utica, New York.

The deposit for Plans and Proposal Forms for Contract M 59-10 is $10.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Proposals for Contract M 59-10 must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" in the amount of $1,700.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Canal Law and Highway Law as set forth in "Instructions to Bidders" in the contract specifications.

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

Bids: September 8, 1959

Contract BP-502.277

THE PORT OF NEW YORK AUTHORITY
BROOKLYN-PORT AUTHORITY PIERS
PIER NO. 6
TEST PILES

Sealed proposals for driving and loading test piles for proposed Pier No. 6 at the Brooklyn-Port Authority Piers will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, September 8, 1959, at which time said proposals will be opened and read in Room 1108.

Contract Documents may be seen at the office of the Assistant Chief Engineer for Design of the Authority, Room 1115, and copies will be furnished upon request. No deposit will be required but the documents shall be returned in good condition not later than forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt, Chairman

New York, August 27, 1959

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5232) will be received at Prineville, Oregon, until 10 a.m., Pacific Standard Time, October 1, 1959, for furnishing labor and materials for earthwork, structures, and surfacing relocation of Oregon Highway No. 27, Prineville Reservoir, Crooked River Project, Oregon. Location near Prineville, Oregon. Principal items are 165,000 cu. yds., excavation for roadway; 1,512 lin. ft., furnishing and laying 12, 18, 24, 36, 48 and 72-inch corrugated metal pipe; 15,600 cu. yds., crushed rock or crushed gravel surfacing; and other work. Completion time 330 days. For particulars, address Bureau of Reclamation, P. O. Box 937, Boise, Idaho; P. O. Box 477, Prineville, Oregon; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

EMPLOYMENT NATIONAL COVERAGE OPPORTUNITIES

DISPLAYED RATE:

The advertising rate is $39.20 per inch for all advertising appearing on other than a contract basis. Frequency rates quoted on request.

An advertising inch is measured 7/8" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

SEPTEMBER 2ND ISSUE CLOSES AUGUST 24TH

UNDISPLAYED RATE:

$2.40 per line, minimum 3 lines. To figure advance payment on 5 average words as a line.

Position Wanted ads take ½ of above rate.

Box numbers—count as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to agency Commission.

Send NEW Ads and Inquiries to Classified Advertising Division or ENGINEERING NEWS-RECORD, P. O. Box 12, N. Y. 36.

ADDRESS BOX NO. REPLIES TO: Box. No. Classified Adv. Div. of this publication. Send to office nearest you.
NEW YORK 36: P. O. BOX 12
CHICAGO 11: 520 N. Michigan Ave.
SAN FRANCISCO 4: 68 Post St.

• POSITIONS VACANT

Asst. Prof.—To teach undergrad. courses in transportation, surveying, and fluid mechanics. Salary open. Civil Eng., University of No. Dak., Grand Forks.

Wanted: Young graduate Civil or Hydraulic Engineer interested in overseas assignment with consulting firm. State education, background and experience. Reply fully to P-2359, Engineering News-Record.

Contractors project engineer, also General Superintendent, experienced large dam construction. Overseas assignment, good salary and living conditions. Mail full particulars. P-2376, Engineering News-Record.

Wanted—Sanitary Engineer for department head of established firm in Midwest. Prefer age between 35 and 55. Applicant should have had responsibility of design of sewage and water treatment plant. Salary five figures with fringe benefits. Answer P-2353, Engineering News-Record.

Construction Superintendent: Immediate opening. We are seeking an experienced man capable of assuming complete responsibility for road construction projects ranging from $500,000 to $1,500,000. Opportunity to purchase partial interest will follow proven ability. CE degree preferred. Must be experienced in estimating and willing to relocate in central Vermont. Salary open. Reply to: Baslow Construction Corp., 45 Center St., Rutland, Vermont.

Draftsman for work in connection with preplanning on large building construction projects. An excellent opportunity for a capable man to grow with a large and expanding national construction company. Submit complete resume covering experience, education, references, personal data and salary requirements to Personnel Director, Blount Brothers Construction Company, P. O. Box 949, Montgomery, Alabama.

Civil Engineer minimum 5 years experience highway design for established consulting firm. Location Washington, D. C. Submit resume. P-2270, Engineering News-Record.

Experienced Architectural Draftsmen. Excellent opportunity with established consulting firm in Middle West. State education, experience, and required salary. Reply to P-1545, Engineering News-Record.

Growing General Contractor needs recent Engineer Graduates in Management Training program. Excellent opportunity for aggressive, ambitious men to work in south and southwest area. P. G. Bell & Co., Inc., P. O. Box 18196, Houston 19, Texas.

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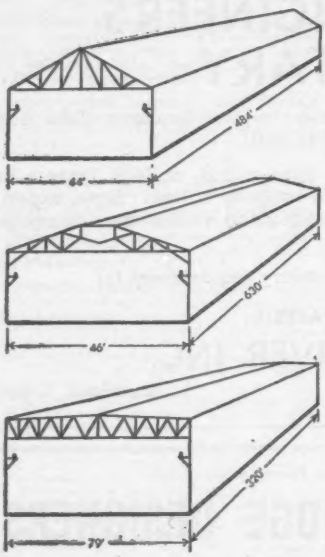

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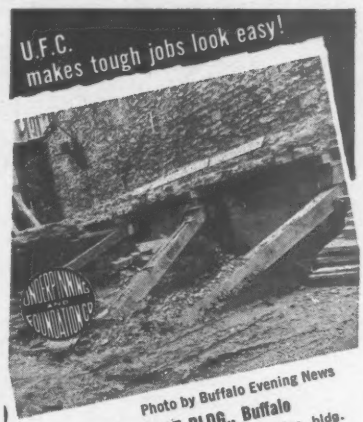

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Opportunity Fading

LESS THAN 1 OUT OF 4 of the 43,000 members of the American Society of Civil Engineers has made a contribution to the campaign to finance a great new United Engineering Center in New York. Such a poor showing, unless greatly improved, cannot help but reflect adversely on the engineering profession and its claims to leadership and greater public recognition.

For the usual type of fund-raising campaign, only 25% support may be acceptable, but it is shockingly low for a project involving such a high degree of professional responsibility and plain self-interest as this one. Not only is the U.E.C. badly needed to replace the present inefficient and worn-out headquarters of the nation's principal engineering societies, it will also—by its size, modernity and prominent location—symbolize the engineer's important place in the world and suggest to all and sundry that the importance is deserved.

For any engineer to pass up the opportunity to have a part in this project will almost certainly cause him regrets in later years as he benefits from the advantages that he let someone else provide. Nor can these advantages be so great as otherwise since professional strength and solidarity are bound to suffer when a few are required to carry the responsibilities of the many. Actually, too, the responsibilities of the individual engineer are greatly lessened through the generosity of American industry in assuming half the entire cost of the project.

The fact is that the opportunity to participate in the financing of the United Engineering Center is fading fast. Over 70% of the $10 million required has already been pledged, plans are complete, the contract has been awarded, and the construction is scheduled to start in October. It is, therefore, no longer a question of whether the project will go ahead, but of who and how many will be privileged to have a part in it.

The A.S.C.E.'s modest quota of $800,000 has been met to the extent of $560,000 by the 9,600 members who have grasped the opportunity to express pride and confidence in the profession by a contribution. Moreover, many of these same individuals have been discharging a further responsibility by working on fund-raising committees of the society's local sections to make it easy for every member to contribute. The result is that the quota deficit becomes steadily less, along with the opportunity to make even the minimum contribution of about $25, let alone one that reflects an individual's honest assessment of his true debt to the profession and his ability to discharge it.

Most civil engineers who regard their calling as a profession are members of the American Society of Civil Engineers. Those who have contributed to the United Engineering Center fund can continue this regard with considerable satisfaction. It is doubtful if the much larger number who are in danger of missing their oppor tunity to have a part in the project can be so fortunate This is not a good prospect either for themselves or fo engineering as a profession.

The Dam Stood

FROM OBSCURITY TO FAME IN MINUTES—that was th lot last week of Hebgen Dam, a property of the Mon tana Power Co., located just west of Yellowstone Par In withstanding an earthquake of major intensity, th 300,000-cu-yd-earth embankment, rising 87 ft above th streambed, provided dam designers with one of the ver few such full-size tests on record. Although badly shake and even visibly displaced, the embankment maintain its integrity, saving many lives as well as the compan investment.

Proponents of earth, and also rockfill, dams have lo maintained that these types of structures are not on inherently stable, but have the ability to adjust t foundation movement or the application of unusu forces. The performance of Hebgen Dam lends su port to this claim, even though its use of a heavy co crete corewall of a type now obsolete makes the da somewhat special.

Built in 1915, when earthdam design was much le scientific than now, Hebgen Dam could not have co tained any special provisions to resist earthquake stresse although the designers likely considered them. Eve today, designers of such structures face somewhat th same situation. Masonry dams, of massive or arch typ can be proportioned or strengthened to resist the acce eration forces of major earthquakes, which are on th order of one-tenth to two-tenths of gravity. The earth dam designer, however, has less opportunity to use suc calculable means of strengthening. His best defense ha been to make his section amply large to resist the hydr static head, amply long to keep the foundation stress low and the hydraulic gradient from intersecting th downstream face and amply flat to be safely under th natural angle of repose of his materials. After that h must rely on good construction methods and the sele tion of good materials to assure a sound and stab structure.

The Hebgen Dam experience does not positively pro that any properly designed and constructed earthda will stand in a major earthquake. But it helps to su port that viewpoint. Its past history and post-eart quake condition should now be carefully studied an documented to reveal, if possible, any crumbs of know edge that can be used to improve earthdam practic In the meantime, designers can continue, with som increased confidence, to follow methods that moder science and past experience indicate will produce stable, watertight earth or rockfill embankment.